

NETWORK WORLD

THE WEEKLY FOR LEADING USERS OF COMMUNICATIONS PRODUCTS & SERVICES

VOLUME 4, NUMBER 8

FEBRUARY 23, 1987

► BUYING POWER

State wins big with net upgrade project

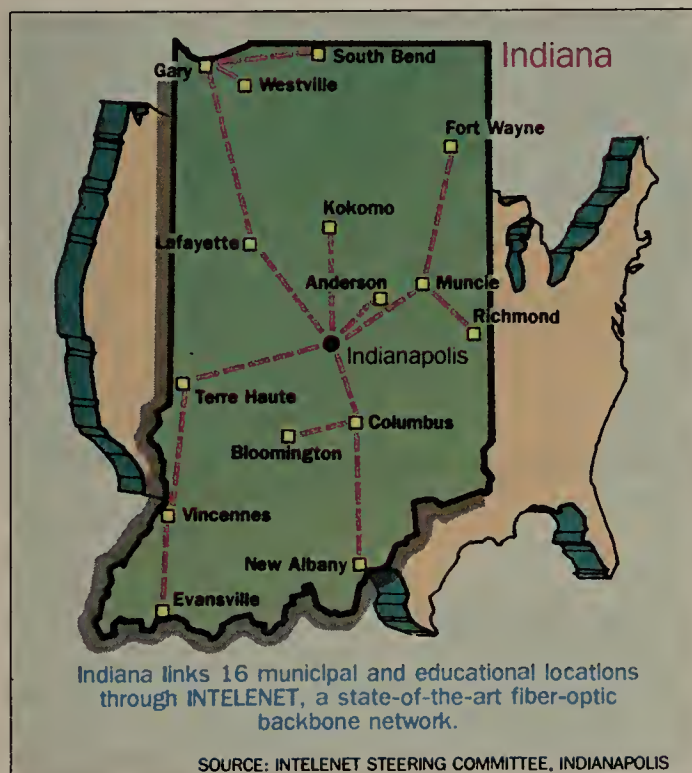
Indiana dangles pact to win cost-paring extras.

BY PAUL KORZENIOWSKI
Senior Editor

INDIANAPOLIS — Playing three vendor teams off one another for a lucrative backbone network contract, the state of Indiana has won a number of cost-cutting concessions, including fixed line charges, no up-front costs, a vendor-operated network management system and installation of 150 miles of fiber cable.

The \$50 million-to-\$200 million contract for the statewide network, dubbed Indiana Telecommunications Network (INTELENET), was awarded earlier this month to GTE Telecom, Inc. INTELENET will provide a variety of voice, data and video services to state agencies, state and private higher education institutions, and other local government agencies. GTE Telecom bid with partners GTE Midwestern Telephone and US Sprint Communications Co., the long-distance carrier half owned by GTE Corp.

The contract award culminated a six-year
See **Upgrade** page 40



► NETWORK MANAGEMENT

NetView awaits vendor backing to blossom

BY JOSH GONZE
Staff Writer

Users hungry for centralized network management can set their tables with IBM's NetView, but the good eating won't come until other vendors fully embrace the host-based software product.

Vendors generally agree that NetView is a step toward resolving a legitimate user complaint — that managing networks consisting of a mix of vendor equipment is difficult and costly. Many vendors also agree NetView has a future as a de facto net management standard, at least for products in the Systems Network Architecture environment. But realization of NetView's promise hinges on compatibility of other vendors' products, and that will take time.

"In its current version, it's a small but important step," said Barry Charton, director of marketing at Bytex Corp., a Southboro, Mass.-based matrix switch maker.

Truly integrated net control would enable users to manage a mix of vendors' data and voice communications network equipment from a sin-
See **NetView** page 39

NETWORK LINE

News

At a Baltimore meeting, the System 85 Users Group wins an agreement from AT&T to continue supplying vital components and voices its requirements for future enhancements to the top-of-the-line private branch exchange. Page 2.

▼
PBX-provided least-cost routing software enables users to employ the most economical long-distance service, though intra-LATA competition may complicate matters for many private switch users. Page 2.

▼
At a press briefing, IBM gives nary a glimpse of its long-term strategy, but the accompanying product an-

nouncements reveal some of Big Blue's networking designs. Page 4.

▼
In a move mandated by local network market forces, DEC may be poised to offer IBM NETBIOS compatibility with its DECnet DOS Version 2. Page 4.

▼
Speakers at the USTA's Eastern Telecommunications Showcase '87 in Indianapolis thrash out the thorny issue of further deregulation of the Bell operating companies. Page 5.

▼
Novell throws a development party and kicks it off with the debut of its own Ethernet adapter card, which carries a much lower price tag than the 3Com version the company currently sells. Page 6.

FEATURE FOCUS

Northern Telecom's DV-1: No longer an adolescent

BY PAULA MUSICH
Senior Editor

Northern Telecom, Inc.'s DV-1 Data Voice System debuted in 1985, but only now is it living up to its promise of effectively integrating telephony, information processing and data communications in one system.

After two years of beta testing, shipment delays and hardware and software upgrades, the DV-1 has finally matured. "The system has really been coming together since September," says John Pearson, director of MIS at Anchor Glass Container Corp. in Tampa, Fla.

Anchor, an early DV-1 user, is cur-
See **DV-1** page 29

► NET MANAGEMENT VENTURE

Firm poised for buyout binge

Ex-Contel chief Howard Frank steers start-up.

BY PAUL KORZENIOWSKI
Senior Editor

BETHESDA, Md. — With a war chest of \$50 million in venture capital, a start-up company here is attempting to bring an integrated network management system to market by acquiring existing product and service suppliers, *Network World* has learned.

Howard Frank, founder of Network

Management, Inc. (NMI) and one-time president and chief executive officer of Contel Information Systems, said last week he is finalizing details of NMI's first company buyout, which he expects to announce in the next few weeks. Frank said NMI plans to acquire as many as three more companies this year and possibly two more during 1988. He would not divulge the names of any of the companies

See **Buyout** page 42

► PEER-TO-PEER COMMUNICATIONS

Planning for LU 6.2 is difficult, users lament

Firms test out new networking options.

BY MARY PETROSKY

West Coast Correspondent

Planning for the implementation of IBM's LU 6.2 is more difficult than actually working with the fledgling communications facility, early users report.

Part of IBM's Systems Network Architecture, LU 6.2 — also referred to as Advanced Program-to-Program Communications — defines a set of programming verbs that can be embedded in applications and called on when one device needs to access information located on another device.

Users are employing LU 6.2 in a number of applications, ranging from interconnecting heterogeneous equipment and providing messaging across various systems, to developing distributed systems.

The real promise of LU 6.2, according to some observers, is that it will make possible peer-to-peer communications and development of distributed applications. This

will enable mainframe tasks to be off-loaded to multiple smaller processors, thus improving host efficiency by freeing mainframe processing cycles and easing the burden of host communications associated with terminal support.

LU 6.2 can also help users consolidate their networks by providing support for a wide range of devices, according to Mike Graves, vice-president of the western region for Bedford Associates, a Norwalk, Conn.-based consulting firm.

"The first step of LU 6.2 is to get everybody to play together," Graves said. "In some cases, LU 6.2 can buy users expanded connectivity." Digital Equipment Corp., Tandem Computers, Inc., Control Data Corp., Wang Laboratories, Inc. and others already support or plan to support LU 6.2. "I think people with multiple networks will reduce their network costs if they use LU 6.2 to bring these networks together," Graves added.

Clemson University in Clemson,

S.C., is using an off-the-shelf DEC product that employs LU 6.2, the DISOSS Document Exchange Facility (DDXF), to pass documents between DEC's All-in-1 and IBM's DISOSS, said Richard Nelson, director of consulting and technical services for Clemson.

"DDXF uses LU 6.2 to communicate with DISOSS, so we're using LU 6.2 but not doing any actual coding ourselves," Nelson said.

Nelson said he would like to see DEC improve its use of LU 6.2. Currently, distributing documents via DDXF is a two-step process, requiring users to get out of All-in-1 and sign on to DISOSS through DDXF. Nelson said he would prefer users be able to distribute documents directly.

Beyond providing connectivity and messaging, LU 6.2 is enabling users to develop true distributed applications. Taking full advantage of LU 6.2 is the next step.

See LU 6.2 page 8

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► NET OPTIMIZATION

Least-cost routing still art form

BY MICHAEL FAHEY

Staff Writer

Although it has been transformed from a science to an art form by changes in the telecommunications tariff environment, least-cost routing via private branch exchanges remains an important way for telecommunications managers to save on telephone costs.

In the late 1970s and early 1980s, extremely complicated WATS banding schemes brought about the widespread use of PBX software programs that enabled users to access the most economical carrier for each call. Now, the interexchange carriers are offering new lines of graduated calling options such as AT&T's Pro America II and III, Megacom and MCI Communications Corp.'s Prism.

While many of these new carrier options do not require the same kind of detailed analysis as did earlier WATS offerings — taking into account such things as geographic service bands and line packing — least-cost routing software is still important in helping users capitalize on their most economical services.

Further complicating the task of least-cost routing, at least 16 states now allow long-distance carriers to

See Art page 39

Correction: The chart used in the Local Networking section of the Feb. 9 issue erroneously identified the cost per connection for personal computer and manufacturing system networks. The two lines representing the change in costs for these net schemes over time were transposed.

► USERS ORGANIZATIONS

S/85 group flexes muscle

BY BOB WALLACE

Senior Editor

BALTIMORE — Users attending the annual AT&T System 85 Users Group meeting here last week said they would like AT&T to enhance the top-of-the-line switch with features available on the smaller System 75, and they persuaded AT&T to continue offering a line of telephone sets AT&T was ready to discontinue, *Network World* has learned.

Tom Frenette, network communications manager for Black & Decker Corp. of Towson, Md., and president of the 270-member users group, said users asked AT&T for many features currently available on the System 75. These include support of circuit cards for modem pooling that would eliminate the need to maintain ancillary hardware and call parking, the ability to transfer calls to a busy extension.

Users group members also convinced AT&T to continue providing, on a limited basis, a line of telephone sets that AT&T was ready to discontinue. Like other large corporate users at the meeting, "we had standardized on the Model 7000 telephone sets in our company," Frenette said. "AT&T agreed at this meeting to continue offering this equipment, which will save Black & Decker several thousand dollars."

Frenette said several of the features users asked AT&T to add to

the System 85 at the group's first meeting in January 1985 have been incorporated in the latest software release for the switch. "One such System 85 improvement enables users to bridge analog to digital telephone sets," he said.

Frenette also said the users group recently established an eight-user committee that has already begun to work with AT&T to determine features that should be supported in future releases of the private branch exchange software. Each member of the Feature Needs Committee represents a different

industry, he explained.

"The group works with AT&T on a continuing basis to help the company target development efforts at specific areas." Representatives of the group surveyed members of the fast-growing users body at last week's meeting to determine which improvements users would like incorporated in future versions of the System 85.

"We are not simply a complaint group," Frenette stated. "We have found we receive much more support from AT&T when we work with the company rather than treating it as an adversary."

Users interested in joining the group can contact Frenette at (301) 583-2817, or Suzanne Molenaar, membership director for the users group, at (612) 828-8787. □

Table of contents

TOP NEWS

Microwave radio networks are bound to abound as a result of an FCC ruling opening the frequency range. **Page 38.**

Report charges former INTELSTAT execs Richard Colino and Jose Alegrett illegally lined their pockets with over \$5 million in consortium cash. **Page 39.**

INDUSTRY UPDATE

Despite the lackluster private packet-switching market, BBN shines brightly, landing contracts with Barclays and Procter & Gamble. **Page 9.**

TELECOM TRENDS

Grumman boldly enters the modern networking age with a digital Centrex net upgrade provided by N.Y. Telephone. **Page 11.**

DATA DELIVERY

Gordon Jewelry's faultfinder finds flaws, not in diamonds but in its 600-location POS net. **Page 13.**

LOCAL NETWORKING

Personal computers in the Fortune 1,000 are stand-alone for the most part, though local networks have made significant

inroads, study says. **Page 15.**

COMMUNICATIONS MANAGER

Political savvy and top-notch management skills are needed by communications managers in today's Fortune 500, say search and placement firms. **Page 17.**

NEW PRODUCTS AND SERVICES

Jupiter's multipurpose System 1000 microcomputer performs multiple functions over multivendor nets. **Page 21.**

FEATURES CALENDAR

Page 28.
Page 42.

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► IBM INSIGHTS

IBM press confab yields glimpse at net strategy

Big Blue unwraps bevy of new products.

BY PAUL KORZENIOWSKI

Senior Editor

NEW YORK — In a press briefing highlighted by a raft of product announcements, IBM filled in a few more pieces in its communications puzzle last week but gave little real insight into its long-term strategy.

The focal point of last week's product barrage of some 50 new items was the IBM Personal Computer RT, which reportedly has met with stiff competition from technical workstations supplied by such vendors as Apollo Computer, Inc. and Sun Microcomputer Systems, Inc. To make the RT more attractive, the product's networking capabilities were upgraded through enhancements to the RT's Advanced Interactive Executive

(AIX) operating system.

AIX's support of the Department of Defense's Transmission Control Protocol/Internet Protocol was extended for use with the IBM Token-Ring Network. Previously, the RT only supported TCP/IP over Ethernet local networks.

IBM also gave the operating system support of IBM's LU 6.2 communications protocol, a capability that enables users to run LU 6.2 applications over Ethernet.

The first application to take advantage of that capability was also announced, RT PC Distributed Services. This program supplies users with access to programs and files running on various RTs connected by Ethernet or by an IBM Synchronous Data Link Control link. The software costs \$850 and will be available in June.

IBM last week also delivered Distributed Data Management support for standard Personal Computers (DDM/PC). The architecture, first described last June, defines a system-independent structure meant to enable applications running on one system to access files residing on another.

Besides DDM/PC, DDM is now available for the IBM System/36, the System/38 and System/370 mainframes outfitted with CICS/Operating System/Virtual Storage. DDM/PC has an application program interface that can be used with programs written in Pascal, C or IBM Macro Assembler Version 2. DDM users can specify two types of nodes for systems in a network — source and target. Source processors ask for files stored on target systems.

With the latest release, a Personal Computer can act as a source processor allowing a user to request DDM files stored on target systems such as CICS, System/36 and System/38. DDM/PC costs \$395 and will be available in the third quarter.

IBM added two new and smaller
See IBM page 38

► DIGITAL EQUIPMENT CORP.

DECnet DOS may support NETBIOS

CW Communications International News Service

LONDON — Digital Equipment Corp. will provide IBM NETBIOS compatibility with Version 2 of DECnet DOS, scheduled to be released this fall, a top DEC official said here last week.

"It's not a certainty, but it is very possible," said Charles Monk, product manager here for the VAXmate. Officials in DEC's Merrimack, N.H., plant, which is respon-

sible for DECnet software development, refused comment.

Analysts said, however, that folding IBM's Network Basic I/O System compatibility into DECnet DOS is a must for DEC to compete in the local-area network market. DECnet DOS enables IBM Personal Computers running under DOS to act as intelligent network nodes in DECnet, as opposed to emulating terminals in that environment.

The absence of a NETBIOS inter-

face in DECnet DOS currently limits the transparency of the network. Alistair Banks, project leader with Midland Bank plc's Group Treasury, a major UK user, regards the lack of NETBIOS support as a "serious omission" in an otherwise good product.

Midland now has VAXmates and MicroVAX IIs hooked together. The VAXmate's use of windowing conforms with Midland's decision to standardize around the Microsoft Corp.-developed interface,

Lack of NETBIOS support is a "serious omission" in an otherwise good product.

Banks explained. But while Banks is happy with the ability to interface between both DOS and VMS, DECnet has limitations. "The main problem is that you can't use industry standard software that relies on being able to find NETBIOS in order to run," he said.

David Terrie, editor of Patty Seybold's "Network Monitor" newsletter, said NETBIOS-compatible DECnet DOS may eliminate the need for a MicroVAX to act as a network server for personal computers attached to DECnet. □

Jim Brown contributed to this story.

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► SHOWCASE '87

Deregulation hot topic at USTA meet

*Conference-goers split on BOC freedom.***BY PAM POWERS**
Senior Editor

INDIANAPOLIS — The U.S. Telephone Association's (USTA) Eastern Telecommunications Showcase '87, held here last week, was a hotbed of debate over recent proposals for further deregulation of the regional Bell holding companies.

Ameritech Chairman and Chief Executive Officer William L. Weiss set the theme for the show with a keynote speech denouncing restrictions imposed at divestiture and calling for full deregulation.

Weiss said that, for the most part, he approved of the Huber Report, which recommends the lifting of most restrictions on the RBHCs, but limits their freedom in the long-distance market. Ameritech has no interest in developing its

own information services or manufacturing operations, Weiss said, but wishes to partner with companies already established in those fields.

Weiss contended that the RBHCs enjoy monopoly status only in markets where other companies choose not to compete. Current restrictions protect AT&T, giving it free reign in interexchange, computer and services markets, while imposing punitive measures on the RBHCs, Weiss said.

But deregulation had its detractors at the show. Michael Birck, president of Tellabs, Inc., of Lisle, Ill., and former president of USTA, said he has strong reservations about deregulation. "Despite what they may tell you, the RBHCs do represent a bottleneck. There is simply no question that they dominate the local exchange market.

There are no numbers to support the charge that the RBHCs are threatened financially while AT&T is raking in profits as a result of current restrictions," he said.

In Birck's opinion, the RBHCs should be granted freedom to compete in information services, but should be prohibited from equipment manufacturing. "If we allow [the RBHCs into manufacturing], I assure you they will affiliate with large foreign operations. That will worsen the balance of trade, not strengthen it."

The issue was further debated in a two-hour panel session balancing the perspectives of representatives of a state Public Utilities Commission (PUC), an independent telephone company and Ameritech.

Bill Long, chairman of the Michigan PUC, said he approved of further deregulation, adding that increased revenue for the RBHCs will lead to lower overall telephone rates, thereby fueling inexpensive universal service. Long cautioned, however, that the RBHCs do operate in the absence of competition in some residential and small business markets, and those markets should continue to be regulated to ensure fair pricing practices.

Jeff McGhee, general manager with Southland Telephone Co., an independent operation based in Atmore, Ala., countered Long's optimism saying that smaller independents need time to arm themselves properly to battle the liberated RBHCs. McGhee said "the current size and dominance of the RBHCs is of great concern to small local exchange companies. Business in the local exchange is still monopolistic."

Exhibitors at the show had different reactions, but most were in favor of deregulation. Siemens Communications Systems, Inc., whose parent company is based in West Germany, could benefit from deregulation if the RBHCs team up with central office equipment vendors. "We have already talked to some RBHCs about joint development of features and services," according to Ron Weindruch, vice-president of sales. "I think it would be good for both us and our customers to pair with the RBHCs," he said.

Howard Garvey, vice-president of marketing at Northern Telecom, Inc., agreed. Northern Telecom endorses deregulation, he said, although it believes the restrictions on interexchange services are too limiting. "I agree with Ameritech's position that the restrictions are punitive," Garvey said. "AT&T can play in all these markets, giving them clear domination." □

► SHOWCASE '87

AT&T widens ISDN line

*Terminal gear unveiled at USTA show.***BY BOB WALLACE**
Senior Editor

INDIANAPOLIS — AT&T fortified its nascent Integrated Services Digital Network equipment line with a bevy of ISDN terminal products at the U.S. Telephone Association's Eastern Telecommunications Showcase '87 conference held here last week.

Among the products introduced were four voice/data terminals, an attendant console, a pair of synchronous and asynchronous data termination devices and a pair of digital, voice-only key telephones. The equipment is slated to be available in the first half of 1988.

This latest wave of product introductions came one week after AT&T announced ISDN software for its top-of-the-line System 85 private branch exchange at the Communication Networks '87 conference in Washington, D.C. This software will serve as an interface between the PBX and the ISDN network.

All the products unleashed here are compatible with the ISDN "T" interface, which is also referred to as 2B+D. This basic rate interface provides two 64K bit/sec digital channels and one 16K bit/sec signaling channel.

The new terminals included:

- The ISDN Attendant Console, a unit that can support over 35 call handling and administrative features and can be updated from the AT&T central office. The attendant console uses a one-line, 40-character alphanumeric display, and eight programmable buttons. An optional selector console en-

ables the operator to choose free extensions and visually monitor the status of these stations.

- The ISDN 3270 Data Modules, which enable IBM 3270-type terminals to communicate through an AT&T central office equipped with a 5ESS switch. The ISDN 3270T Data Module is equipped with a standard four-pair modular jack connector for connection to building telephone wiring and a single coaxial port for connection to a Category A 3270 terminal.

- The ISDN 7500 Data Module, which adapts synchronous or asynchronous data equipment to the ISDN network. This device is designed for data centers and data applications that do not require simultaneous voice communications.

- The ISDN 7514 Voice/Data Terminal, which can simultaneously transmit voice and synchronous data at either 56K bit/sec or 64K bit/sec. This device is equipped with a V.35 connector for hooking data terminal equipment to the station set.

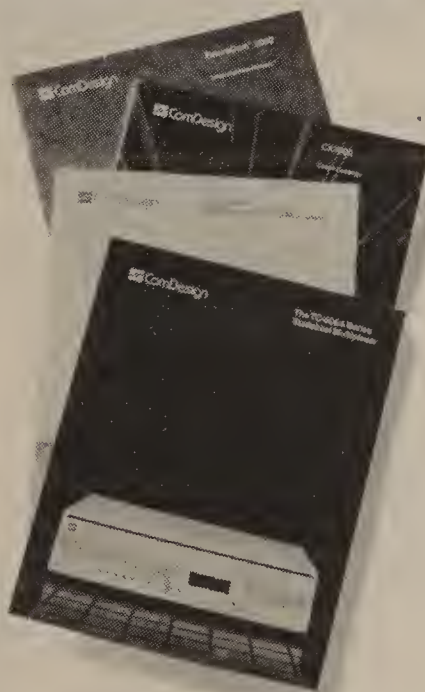
Also introduced were:

- Ten- and 30-button ISDN Key Telephones, which are digital voice-only telephones. The sets provide support service between the end user and a central office equipped with an AT&T 5ESS switch using a two-wire connection.

- The ISDN 7505 Modular Terminal and the ISDN 7506 Display Terminal, both of which support voice transmission and, when equipped with an RS-232 connector for linking data terminal equipment, simultaneous data at speeds up to 19.2K bit/sec. □

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► DEVELOPERS' FORUM

Novell unveils Ethernet adapter and mail tools

Will also acquire Texas software firm.

BY PAULA MUSICH

Senior Editor

SALT LAKE CITY — Novell, Inc. kicked off its developers' conference here last week with the introduction of its own Ethernet adapter card, an application developer's tool kit and news of another acquisition.

Novell's personal computer Ethernet adapter card will replace the 3Com Corp. adapters Novell currently resells. The company's contract with 3Com for the workstation adapters will expire shortly. The adapter is intended for use in a network workstation or 8-bit server. It does not require support of the Transmission Control Protocol/Internet Protocol.

Novell opted to produce its own adapter, which will be available in the second quarter of this year, to reduce costs, said Craig Burton, Novell's vice-president of marketing and development. The adapter will be priced at \$495, \$100 below the price of the 3Com card.

"One of our intentions in help-

ing the industry grow faster is to help bring adapter costs down," Burton said. "Why would someone buy a PC for \$380 [a local dealer's cost for a personal computer clone] and then buy an adapter for \$595 or \$695 to connect it to a network? We think the price of the adapter for the PC has got to go down."

The Ethernet adapter is an IEEE

Novell opted to produce its own adapter to reduce costs.

802.3-compatible half card that includes an on-board transceiver supporting thick and thin Ethernet cabling types. It is compatible with other NetWare-supported Ethernet adapters, including those from Microm-Interlan, Inc., 3Com and Ungermann-Bass, Inc.

Novell's NetWare Developer's Kit aids users in developing applications that support the company's Message Handling Service (MHS). This service allows users to exchange messages between local and remote nets and between local networks and larger systems.

The first release of the NetWare Developer's Kit, due in March, will allow applications written to MHS to exchange information over asynchronous links.

"The effort required to build a device that lets information flow between remote and local networks as well as internetworks is significant," Burton said. "Our intention is to ease that burden and provide applications that use MHS."

MHS allows information to be exchanged between applications using the same or unlike formats. For example, information could be transferred between Novell's Coordinator System and Digital Equipment Corp.'s All-in-1, although they use dissimilar formats. Information can also be exchanged between an electronic mail program and a distributed data base program written to MHS.

The Coordinator, announced late last year, is the first application to support MHS. It combines electronic messaging, word processing and calendaring functions.

MHS is also network operating system independent. It can operate over the IBM PC LAN Program, 3Com's EtherSeries and 3+, Banyan Systems, Inc.'s VINES and networks that support MS-DOS 3.2.

In its first release, the developer's kit will provide support for message pickup and delivery, message store-and-forward, asynchronous dial-up support and an application interface. MHS core services to be available in future releases include conversion services, security services, routing directory services for wide-area networks, and communications services from network to network and between local networks and host systems.

Future releases will also add support for connection protocols such as Systems Network Architecture and X.25, for message protocols such as X.400, and for format translation such as IBM's Professional Office System and DEC's All-in-1. The kit costs \$5,000.

Novell will add other programming tools to its portfolio with its planned acquisition of SoftCraft, Inc. The Austin, Texas-based firm developed the Btrieve data base utility.

SoftCraft, which had \$2 million in sales last year, will be acquired in exchange for 130,400 shares of Novell common stock.

One announcement that was expected but not made at the conference was a change in Novell's pricing for distributors. Although a source close to Novell expects the firm to squeeze out distributors by cutting their profit margins, Burton denied it. "Our server and adapter pricing hasn't changed," he said. The source suggested that Novell wants to do away with distributors and sell through its NetWare centers to cut costs and gain control over distribution. □

► WANS

Gateway bridge links Novell nets

BY PAULA MUSICH

Senior Editor

IRVINE, Calif. — Gateway Communications, Inc. last week introduced G/Remote Bridge, which provides wide-area networking capabilities to users of local nets based on Novell, Inc.'s NetWare network operating system.

Larry Stephenson, executive vice-president of Gateway, described G/Remote Bridge as a high-speed, X.25-based NetWare net-to-net link. "The remote bridge interconnects any Novell NetWare-based network in a way that is transparent to the user," Stephenson said. He added that the product is the first in a series of planned local net tools the company will introduce this year.

G/Remote Bridge combines a personal computer card and soft-

The G/Remote is the first in a series of local net tools.

ware to allow users to set up a virtual link between remote local nets over public or private X.25 data networks. As many as 32 different nets can be connected simultaneously. X.25 support allows transmission speeds up to 19.2K bit/sec, Stephenson said.

The product uses standard NetWare access calls and supports NetWare's communications protocol. The bridge operates over dedicated point-to-point links, dial-up lines and public data networks such as Telenet Communications Corp.'s Telenet and Tymnet/McDonnell Douglas Network Systems, Inc.'s Tymnet.

The bridge also links remote stand-alone personal computers to a local network.

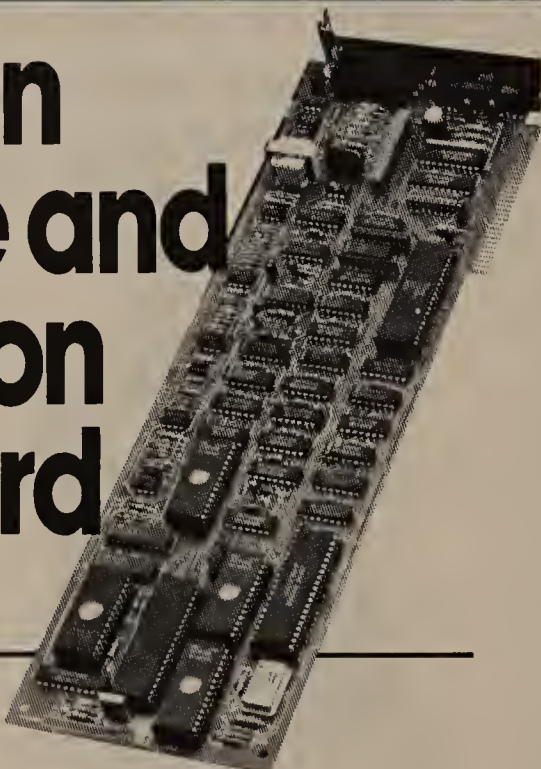
"The bridge employs the Gateway Network Access Method [GNAM] to guarantee packet delivery," Stephenson said. "GNAM provides sophisticated routing as well as error detection and correction. If a virtual circuit fails somewhere along the line, all the user sees is an error message on the screen."

According to Stephenson, Gateway is discussing an OEM agreement with Novell for the product.

The bridge will be available from Gateway by March 1. A starter kit with two G/Remote Bridges is priced at \$2,990. An add-on link for additional networks is priced at \$1,595, and a remote personal computer link is priced at \$795. □

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► CARRIER COMPETITION

US Sprint rewrites the book on WATS tariffs

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — Beginning March 1, US Sprint Communications Co. will restructure the tariffs for most of its WATS services and reduce the rates for its Advanced WATS offering by 2% to 3%, according to a recent filing with the Federal Communications Commission.

US Sprint's new WATS tariffs

are a response to AT&T's WATS cuts, which took effect Jan. 1. US Sprint said its WATS rates offer customers an average 15% savings over AT&T's rates.

The major change in US Sprint's WATS tariffs is the elimination of so-called line averaging. Under that scheme, WATS is billed by adding up hours of use for each line and then dividing that sum

by the customer's total number of lines, giving an average hours of use per line.

Combining all traffic lets users take advantage of less expensive rate steps, which are based on hours of usage. This is intended to encourage users to route as much traffic as possible over US Sprint WATS facilities, according to Peter Buonaiuto, product manager of dedicated WATS services.

"Under the new tariff structure, users will be able to take advantage of greater savings because volume of use will be based on the total and not the per-line usage,"

said Amanda Weathersby, director of product marketing

at US Sprint.

In addition, US Sprint restructured the rate steps for WATS services. Rate steps spell out ranges of hourly usage on which pricing is based. Pricing decreases at each successive rate step. The old steps ranged from zero to 15 hours, 15 to 40 hours, 40 to 80 hours, and 80 hours and up. The new steps are zero to 25 hours, 25 to 50 hours, 50 to 100 hours, and 100 hours and up. The new rate steps apply to most WATS services, including Dial One WATS, Advanced WATS, Advanced WATS Plus and Banded WATS.

In the case of Dial One WATS, US Sprint also reduced the fixed monthly charges for the service. Previously, users paid \$50 for each WATS line. Under the new tariff, the customer will pay a set monthly service fee of \$56.40 for all lines at a location, according to Weathersby. Dial One WATS' new tariff structure also allows customers to use any line for WATS service, rather than have a predetermined number of lines dedicated to WATS use. □

More news: page 38



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CROSSTALK
NETWORK XVI VERSION

LU 6.2 from page 2

tage of this capability requires users to rewrite applications. However, users can migrate to a fully distributed system over time, said Eugene Buechele, vice-president of engineering at Communications Solutions, Inc. (CSI) in San Jose, Calif., a vendor of data communications software products.

"The first wave of distributed applications using LU 6.2 involves moving functions such as data acquisition, syntax checking and screen updates onto the personal computer where possible, and leaving actual transaction processing to the mainframe," Buechele said.

United Airlines is trying to do just that, according to Buechele. The airline is looking to replace its reservation terminals with personal computers connected to a local-area network. "They want to take all the terminal processing off the mainframe and put it on the PCs," Buechele said.

Medical supply company Baxter Travenol Laboratories, Inc. is using LU 6.2 in a similar way, according to Mike Baker, director of distributed systems with the company's business technology division in McGaw Park, Ill. Baker has been involved in a two-year project to overhaul the company's order-entry system. Burroughs Corp. mainframes are being replaced with IBM mainframes, and mini-computers are being swapped for IBM Personal Computers supported with IBM Token-Ring Networks.

Baker said the key reason for the conversion is that the old system could not accommodate the rapid growth of the order-entry system.

According to Baker, the company's original order-entry system was distributed, which minimized application migration problems. Baker is fortunate in that he is also in the process of replacing equipment so he will not have to

See LU 6.2 page 39

INDUSTRY UPDATE

“Once freed, you can be sure the [regional Bell operating companies] will set up affiliations with foreign operations. That won’t strengthen the trade balance, as proponents suggest. It will worsen it.”

Micheal Birck
President, Tellabs, Inc.
Lisle, Ill.

► PRIVATE PACKET NETS

BBN prospers amidst malaise

Reputation aids search for clients.

BY PAM POWERS
Senior Editor

CAMBRIDGE, Mass. — While most vendors in the private packet-switching market have suffered sluggish sales over the past few years, BBN Communications Corp. has been steadily growing, landing

contracts with companies such as Barclays Bank plc and Procter & Gamble Co.

As a wholly owned subsidiary of Bolt Beranek and Newman, Inc., BBN Communications’ sole charter is to design, market, install and maintain private packet networks.

See **BBN** page 10

Profile of Bolt Beranek and Newman, Inc.

	First six months		Percent increase
	1986	1985	
Sales of computer and communications products	\$108.97m	\$82.95m	31.4%
Sales of research, development and consulting services	\$69.1m	\$55.3m	25%
Income from computer and communications products	\$13.71m	\$9.7m	41.6%
Income from research, development and consulting services	\$5.1m	\$4.2m	23.8%

Private packet network contracts

- ☐ MasterCard
- ☐ Procter & Gamble Co.
- ☐ U.S. Defense Data Network
- ☐ Weyerhaeuser Corp.
- ☐ Barclays Bank plc

INDUSTRY EYE PAM POWERS

Once burned, vendors espouse ‘core business’

Like snakes shedding their skins, a startling number of prominent vendors last year sloughed off unprofitable businesses and made solemn vows to attack narrower, more familiar markets with determination.

Companies such as Western Union Corp., M/A Com, Inc., RCA Corp. and the Bell operating companies sold or folded divisions or lines of business that had long sullied their balance sheets.

Invariably, the divested operations fell outside the realm of the companies’ so-called “core businesses,” or their primary lines of business. In fact, a

new-found commitment to core businesses was one of the major trends of the year.

Given the scope and costliness of divestment activities last year, one would think players in the communications industry would develop an almost cultish devotion to their core businesses and henceforward staunchly refuse to dabble in products and services outside that realm. One might almost believe they would eschew ac-

quisitions and mergers and focus on that which made them successful in the first place.

But it seems there’s always that fascination with expansion, with broadening the product line and the customer base. Vendors no doubt will continue to buy out other vendors, all the while intoning formulas for “creating economies of scale”

and “fleshing out product lines.”

In some cases, they’ll be doing just that, and both user and vendor will benefit. In other cases, forays into new lines of business will be followed by disappointment.

Many observers say the BOCs will follow their inclinations toward expansiveness and begin manufacturing equipment as soon as regulations allow. How successful they will be in another area beyond their core business — provision of telephone service — remains to be seen. The BOCs might do well to remember that an opportunity really isn’t one unless it presents itself along with the tools to make it work.

A new-found commitment to core businesses was one of the major trends of the year.

► AT&T

Mass. workers lose jobs

Network Systems force pared down.

BY JOSH GONZE
Staff Writer

NORTH ANDOVER, Mass. — An AT&T Network Systems Group manufacturing plant located here recently laid off 625 workers in response to falling demand for the telephone transmission equipment made at the factory.

The layoff affected nonsalaried workers, but plant spokesman Joseph Giampa would not rule out the possibility of future cuts among salaried workers, as well as further layoffs of nonsalaried workers.

Giampa cited a decline in de-

mand for the plant’s telephone gear as the reason for the layoffs. He admitted that other firms have encroached on this one-time AT&T stronghold. The problem, Giampa said, “has to be competition from other manufacturers.” He did not name any particular competitors.

The plant sells its transmission equipment mainly to the seven regional Bell holding companies.

The 625 laid-off workers, members of Local 1365 of Communications Workers of America, were predominantly testers and operators, representing about 7% of the plant’s 9,500-member work force. □

BRIEFS

Luxcom, Inc. and Ericsson Fiber Optics AB of Sweden, a wholly owned subsidiary of Ericsson AB, have entered into a joint agreement. The companies will engage in the joint development of a family of products based initially on the current Luxcom universal data multiplexer. The products will be aimed at the premises-wiring marketplace.

\$

The **Southern New England Telephone** Board of Directors has approved a share-purchase rights plan designed to protect shareholders in the event of a hostile takeover attempt. The plan is designed to encourage negotiation with the board of directors if anyone should be interested in acquiring the company.

Under the terms of a new marketing agreement, **Orion Group, Inc. and Retix** will each recommend the other’s products to their respective bases of OEM, government agencies and Post Telegraph and Telephone Administration customers.

Both have agreed to develop and market a gateway product that will link Systems Network Architecture networks to Open Systems Interconnect-based systems.

\$

Western Union Corp. has reported it expects a loss of approximately \$54 million for 1986, resulting from a write-down in the value of certain of its communications facilities. The amount takes into account gains of about \$46 million

See **Briefs** page 10

BBN from page 9

Jeff Palmer, the company's vice-president of marketing, says that single-minded dedication is one factor in the company's history of success. "Where else could you possibly find 600 professionals dedicated to the problem of wide-area data networking?" Palmer noted in a recent interview.

BBN has built a reputation that now feeds upon itself. When users consider such big-ticket items as private networks, invariably they seek solid proof-of-performance capabilities and vendor support by consulting other user installations.

BBN's roster includes National Westminster Bank plc, MasterCard, the U.S. Customs Service, and Italy's corporate conglomerate, INI,

among others. The Procter & Gamble and Barclays contracts were recent victories.

Palmer admits that the company makes a lot of its money on overseas contracts. Part of that, he said, is attributable to the industry slump in the domestic market, but "the international market is also more receptive to ISO standards. IBM is less dominant there."

There are indications that the

domestic market is picking up, but Palmer said many users need to be educated about the current benefits of packet-switching technology.

"A lot of users think packet is exclusively X.25 and asynchronous communications. That view is entirely out of date," he said.

It is because of the large installed base of IBM bisynchronous and Systems Network Architecture networks in the domestic market

that BBN is concentrating its efforts in the area of IBM connectivity. The company now has a separate division of full-time employees who work exclusively on integrating SNA and packet networks.

One area dominated by IBM is financial services, and BBN believes that vertical market is ripe with opportunity. The company recently created a financial services division, headed up by Vice-President Samuel Sussman.

"The large number of mergers and acquisitions in this area has created organizations with many different networks running different protocols and different applications," Sussman said.

"These consolidated companies could save a lot of money by combining applications over a single backbone with a single point of control." Continued deregulation of the banking industry will soon lead to interstate banking, and that will further expand BBN's potential user base, he said.

While BBN seems well-positioned for future profits, it faces serious competition from several well-backed giants. Many participants in the packet market have deep pockets, national recognition and well-rounded product lines.

These companies include Northern Telecom, Inc., Telenet Communications Corp. and Tymnet/McDonnell Douglas Network Systems, Inc. Telenet and Tymnet/McDonnell Douglas operate the country's two largest public-switched networks and have the added advantage of being able to sell hybrid public/private networks.

Some smaller companies may also give BBN a run for its money. Telematics, Inc., based in Fort Lauderdale, Fla., has snatched up several large contracts despite its newcomer status.

Netrix Corp., a Herndon, Va.-based start-up that will shortly introduce a circuit/packet switch, last week chose Chuck Stein to be its president. Stein is a former vice-president of BBN and is credited with much of the firm's success in the packet market. □

The domestic market is picking up, but users need to be educated about packet-switching technology.

WHEN IT COMES TO BUILDING WIDE-AREA NETWORKS, THERE'S NO SUBSTITUTE FOR EXPERIENCE.

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Experience that includes designing and building the world's first packet-switching network for the U.S. government back in 1969. Since then, it has evolved into the world's largest wide-area network, the Defense Data Network, connecting over 30,000 users throughout the world.

But the U.S. Government isn't the only customer with tough networking problems that BBN has helped to solve. Numerous major corporations, among them Wang, Weyerhaeuser, and MasterCard, not to mention European giants like England's National Westminster Bank and Italy's largest corporation, ENI, have also found the answers they were looking for from us. Each came to BBN with a unique networking problem—from integrated voice/data transmission to electronic mail to credit authorization—and each came away with a unique networking solution.

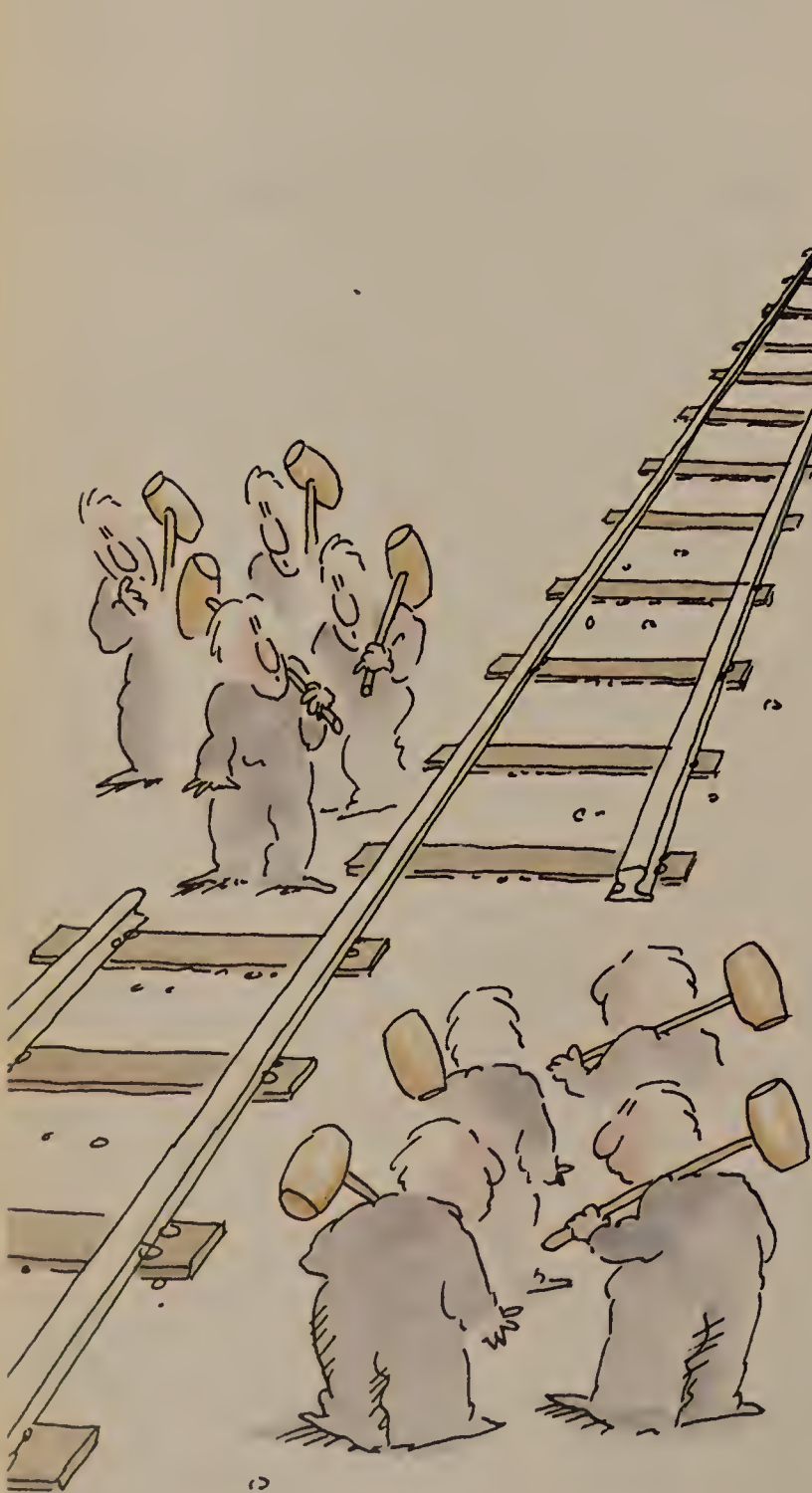
If you're going to make a major commitment to a wide-area network vendor, only three things count. Experience, experience, and experience. In wide-area networking only one company delivers it all.

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**Briefs from page 9**

from the sale of Western Union's Government Systems Division and its interests in Airfone, Inc. and Cellular Communications, Inc.

For the fourth quarter of 1986, before the effects of the write-down and related accruals, the company expects to record income of approximately \$17 million.

\$

Fox Research, Inc. has signed a distribution agreement with **Avnet, Inc.** for the sale of the Fox 10-NET products through its subsidiary, Avnet Computer Technologies, Inc. The Fox product line will be offered through Avnet Computer Technologies sales and service centers nationwide.

\$

Artel Communications Corp. has announced the election of Robert L. Bowman to chairman of the board and chief executive officer. Bowman was chairman and CEO of Telco Systems, Inc. □

TELECOM TRENDS

NATA/NCC show on tap

The North American Telecommunications Association (NATA) and the National Computer Conference (NCC) recently announced a name and a theme for their joint computer-communications conference and exhibition. "Unicom '87 — Combining Computer and Communications Technologies Into Business Solutions" will be held Dec. 1 to 4 in Dallas. For additional information on the show, contact NATA at (202) 296-9800, or NCC at (703) 620-8928.

▶ LONG-DISTANCE

ITT unit cuts rates by 10.7%

BY JOSH GONZE
Staff Writer

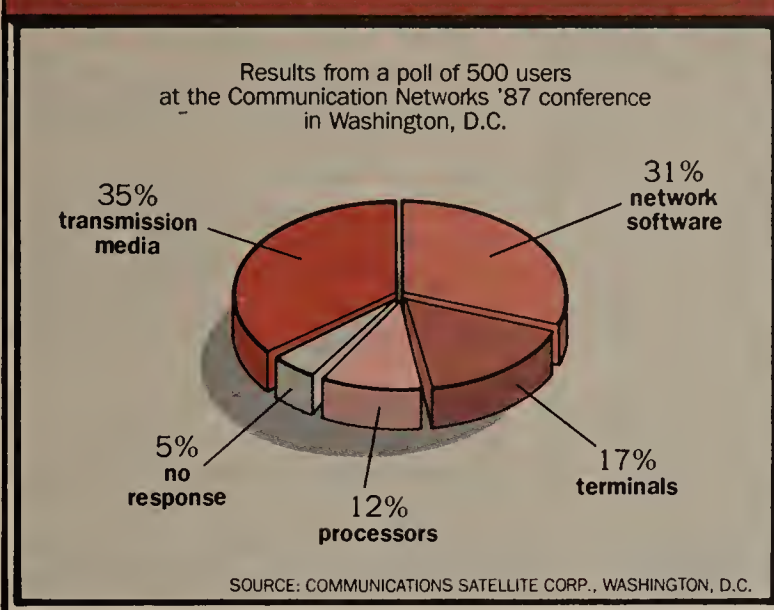
ITT Corp.'s long-distance unit, United States Transmission Systems, Inc., announced rate cuts averaging 10.7%, which, if approved by the FCC, will take effect March 1.

The reductions, which affect rates for ITT long-distance interstate calls made in any of the three rate periods, day, evening or night/weekend, follow similar cuts made last July.

Under the new rates, a three-minute call between New York and Los Angeles during the daytime period would cost \$1.03, representing a 16.9% cut. The same call made between New York and Philadelphia would be cut 17.5%, to 80 cents.

ITT said users reaching specified calling volumes would be entitled to discounts of up to 10%. □

Where networks are vulnerable



TELECOM TIDBITS

Anixter Bros., Inc. announced it has become an official distributor of AT&T's Premises Distribution System (PDS).

As an authorized distributor, Anixter can offer all PDS services, including design, engineering, installation, maintenance and warranty. The company will also stock the full line of PDS products. PDS is a communications wiring plan using twisted-pair and fiber-optic cable.

See **Tidbits** page 12

CROSS TALK BOB WALLACE

Tariff twists make long-term net planning hard to handle

Although users applaud plummeting long-distance service rates, tariff gyrations complicate efforts to plan wide-area networks, particularly when managers try to optimize for cost.

The increased number of tariff changes filed today makes life hard enough, but evaluating changes and options is made all the more complicated by the fact that tariff proposals are often changed before they are implemented.

AT&T's proposed rate reductions and hikes are often quite different from those the Federal Communications Commission approves.

Furthermore, the FCC sometimes changes or delays the date that the price changes go into effect.

Comparison shopping is also complicated because it takes competitors MCI Communications Corp. and US Sprint Communications Co. time to respond to AT&T rates in kind.

"One option is to enter into long-term, fixed-price agreements for services."

Ford Motor Co., which spends \$150 million annually for domestic and international communications services, cannot buy a simple solution to the nagging problem.

The nation's No. 2 automaker claimed that large rate cuts often limit the telecommunications staff's network planning options.

Gerald Peterson, corporate systems development director for Ford, said the user has two basic choices when securing long-distance services.

"One option is to enter into long-term, fixed-price agreements for services," he explained. "The other choice is to negotiate agreements on a short-term basis."

The systems development director claimed Ford has attempted to predict the unpredictable in terms of costs of long-distance services. "We get

See **Tariff** page 12

▶ NETWORK UPGRADE

Grumman opts for Centrex

N.Y. Telephone beats out AT&T for 8-year contract.

BY BOB WALLACE
Senior Editor

BETHPAGE, N.Y. — In a bold attempt to modernize and consolidate its voice and data communications network, Grumman Corp. will cash in a handful of PBXs and numerous intermachine trunk lines for a 20,000-line digital Centrex service that incorporates advanced networking features.

The aerospace giant originally sought to replace its voice net hodgepodge, which consisted of analog Centrex services, several private branch exchanges and a microwave radio system, with an all-PBX network to be anchored by a Class 5 central office switch located here.

Fearful it would lose a large Centrex account, New York Telephone Co. bid for the lucrative eight-year contract with a multisite, digital Centrex solution that would provide a companywide uniform dialing scheme. The Bell operating company proposed supporting individual Grumman locations with digital Centrex and tying the multiple Centrex switching offices together over dial-up lines, through use of a virtual network capability.

AT&T, a major competitor, proposed a PBX-based alternative.

Grumman chose the New York Telephone package, which the BOC admitted was at least two million dollars more expensive than the AT&T proposal, because of the customer control offered. New York Telephone said the network control capabilities for the network would be the same as those only currently available in the BOC's Intellipath II Digital Centrex service.

Grumman Net will serve all company locations on Long Island, including its corporate headquarters here, its office building in Melville, N.Y., and its aircraft assembly, flight test and maintenance center in Calverton, N.Y.

Grumman would not give the value of the network contract nor say what savings the company could expect. New York Telephone said construction of the system has already begun. The BOC predicted Grumman Net will be fully operational in early 1988.

Al Zoitke, telecommunications director for Grumman, said he will be able to reconfigure the communications network instantaneously from a terminal at Grumman's headquarters here. The terminal will provide access to software in New York Telephone's digital central office switches. "The virtual network provides us with a flat, non-usage-sensitive rate for service between network locations."

Zoitke said the company wanted the ability to control the configuration of Grumman Net but did not want to buy PBXs to acquire that control. "We don't want to be in the telephone business," he remarked. "We didn't want to incur the expenses associated with

See **Grumman** page 12

Grumman from page 11

hiring and training staff to operate a [central office switch-multiple PBX] network."

Zoitke claimed the network re-configuration capability available with the new network will prove invaluable because Grumman is frequently adding or deleting network locations. "We will be able to effect necessary changes much more quickly with this system than we could with PBXs," he noted. "If we had chosen a multiple-PBX network, each time we wanted to add another location to the network we would have had to buy another PBX."

The New York Telephone net will provide a single uniform dialing plan for all Grumman Net users.

Presently, each site uses a different plan and authorization code to gain access to the network.

With the new network, a caller will gain access to the network by dialing 9 and seven digits.

Just five years ago, Grumman was a total analog Centrex shop. In recent years, the company installed PBXs at several Long Island locations and implemented a microwave system that handled some voice traffic. With the decision to implement digital Centrex service, Grumman has come full circle.

"We were very concerned about the need to incorporate digital technology in [Grumman Net]. We wanted to position the system in a way that would allow us to use ISDN services in the future," Zoitke

explained.

Grumman Net will take advantage of digital switching and transmission technologies. Under the new network agreement, Centrex services will be provided from several New York Telephone digital central office switches.

Services offered from the switches include automatic call routing, call forwarding, call waiting, speed calling and conference calling.

Non-Centrex gear now used in the company's voice communications network will be phased out. Zoitke said six PBXs scattered among Grumman locations would initially be hooked to Grumman Net but would eventually be replaced by digital Centrex service. The fate of the company's microwave system, which currently handles high-speed data communications between Grumman locations, is undecided.

In the interim period, the microwave network, which provides some 28 T-1 channels, will handle overflow voice traffic from Grumman Net in addition to high-speed data. Zoitke said digital Centrex service will become the preferred means of adding new locations to Grumman Net.

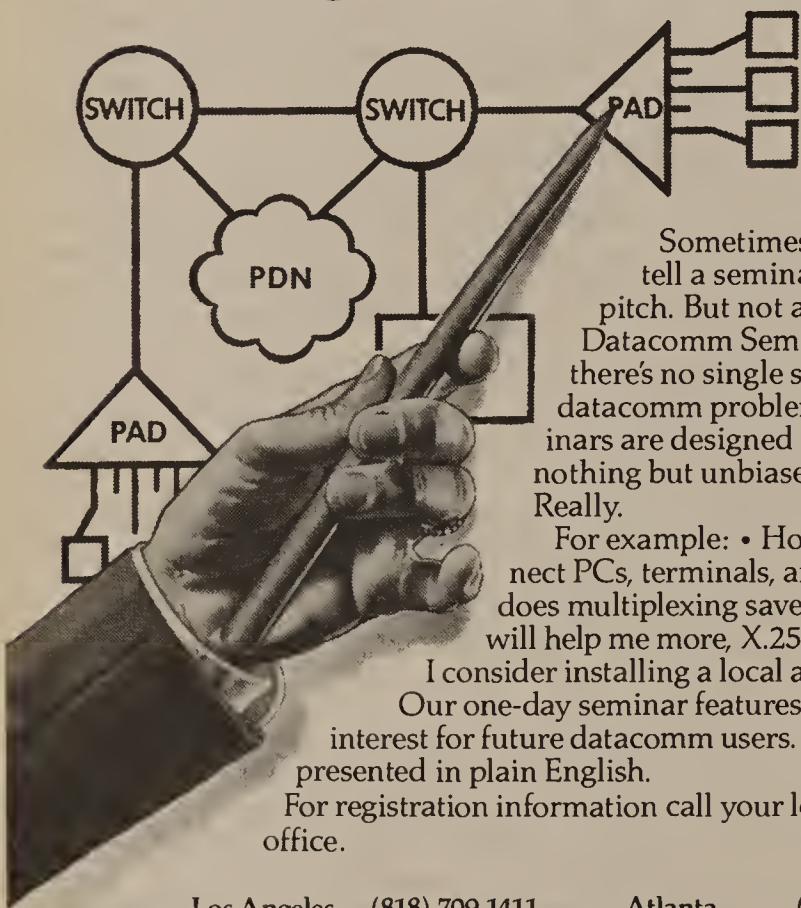
"The cost of connecting new sites to the network with microwave links would be very expensive," he noted.

Responsibility for network management would be split between Grumman's telecommunications staff and New York Telephone technicians, he said.

"Our people would identify and analyze network problems and would turn this information over to the New York Telephone technicians who work at many of our sites," Zoitke explained. "Their people would perform the actual troubleshooting." □

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Anaheim, CA
March 11
Atlanta, GA
January 22
Austin, TX
February 17
Boston, MA
May 20
Burbank, CA
April 22
Chicago, IL
January 13
March 10
Cleveland, OH
February 11
Dallas, TX
February 12
Dayton, OH
January 20
Detroit, MI
February 10
Fort Wayne, IN
March 4

Honolulu, HA
March 5
Houston, TX
February 10
Indianapolis, IN
January 14
Kansas City, MO
January 14
Long Beach, CA
January 14
Louisville, KY
January 21
New York City, NY
January 21
February 25
Orlando, FL
January 29

Pittsburg, PA
March 3
Portland, OR
April 8
Sacramento, CA
March 19
San Diego, CA
February 11
San Jose, CA
January 21
Seattle, WA
February 18
Spokane, WA
May 20
St. Louis, MO
February 25
Tulsa, OK
February 19
Walnut Creek, CA
May 13
Washington, DC
January 15

DATACOMM BY

MICOM

Tariff from page 11

the best advice we can from sources outside Ford. We try to make some assessment of what we think will happen in the future," he related.

Peterson said Ford often opts to enter long-term service arrangements with carriers in an effort to control communications expenses. "We favor such arrangements in some instances because we believe the cost of services will increase in the long run," he explained. "These [arrangements] give us some degree of price stability."

James Hynes, vice-president of telecommunications for Chase Manhattan Bank, N.A., said large rate cuts introduced by AT&T, Sprint and MCI have made planning the future direction of the bank's communications network a tall task. "We try to identify trends in long-

distance service pricing. Network planning is more difficult because the telecommunications industry is unstable and unpredictable," he remarked.

A telecommunications manager for an insurance firm, who requested anonymity, said the instability of the long-distance services market encouraged his company to implement a private voice and data network to control costs.

"These frequent rate changes are serving to push users further and further away from public networking services," he commented.

"Installing a private network means we can project our communications costs for several years and not be affected by any decisions [Federal District Court Justice] Greene makes regarding the telecommunications industry." □

Tidbits from page 11

Digital Sound Corp. enhanced its VoiceServer voice mail product in a recent software release to include such features as message notification and personal assistance in cases of inaccessible call destinations.

The Voice Mail Application Software Release 2.0 also includes such features as delivery check of the subscriber's own messages, enhanced out-dial delivery for immediate posting, personal distribution list options and priority message labeling.

Digital Sound sells the VoiceServer to distributors, OEMs and value-added resellers of private branch exchanges and office automation equipment.

Opcom introduced an enhancement to its call processing system that provides users direct access to computer data bases.

Direct Access Link/Interactive Voice Response (D.I.A.L./IVR) verbally prompts callers to use their push-button telephone keypads to enter and retrieve information from a data base.

The information requested is then read directly to the caller by a

prerecorded voice.

D.I.A.L./IVR uses a dedicated applications processor that is integrated into the D.I.A.L. system through a software-based communications protocol. The IVR appears to a host mainframe computer as a terminal or terminal cluster controller that directly interacts with the current data base application.

Nova-Net Communications, Inc., a very small aperture terminal network provider based in Englewood, Colo., landed a contract to provide a 13-site private satellite network for the Pennsylvania Emergency Management Agency (PEMA). The value of the contract was not available.

Under the agreement, Nova-Net will supply and install the VSATs and provide maintenance and network management for users. After the 13-site network is evaluated, PEMA may choose to expand the network to serve all its sites in the state.

The VSAT network will replace terrestrial leased lines and will carry flood warning information, electronic mail and emergency information. □

DATA DELIVERY

“The time frame needed for a company to develop an application that will supply a strategic advantage is a decade.

Howard Frank
Chairman
Network Management, Inc.
Bethesda, Md.

► POS NETWORKS

Faultfinder is jeweler's gem

Device locates deficient terminals.

BY JIM BROWN
New Products Editor

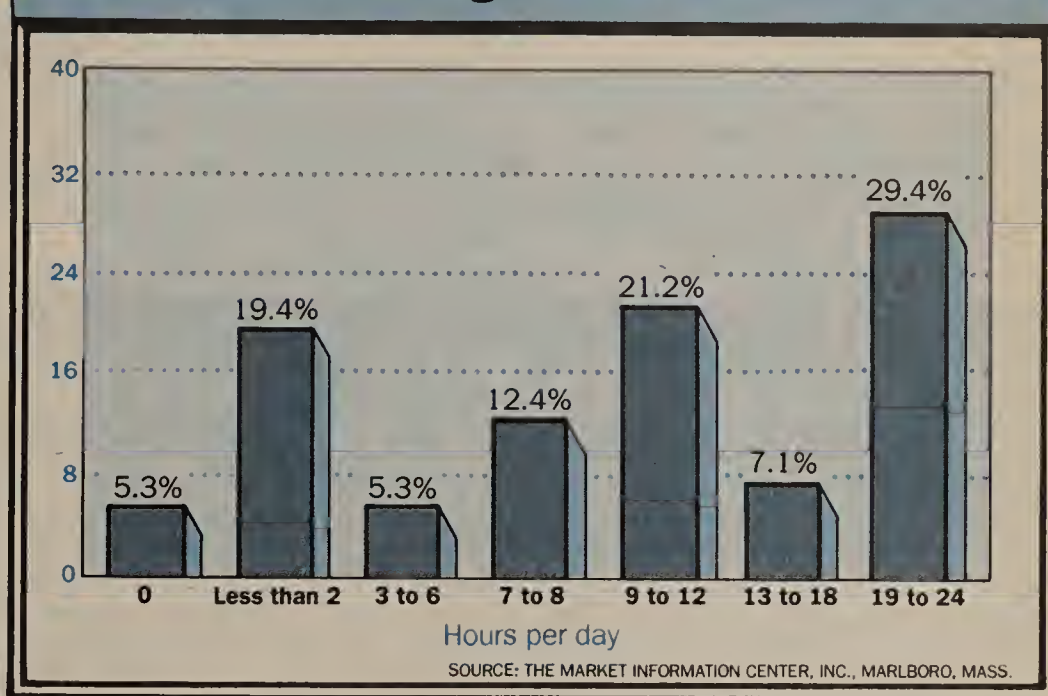
HOUSTON — A device able to pinpoint faulty terminals that bring point-of-sale networks to a standstill is the jewel of one jeweler's eye.

Gordon Jewellery Corp., with a nationwide POS network linking more

than 600 locations to an IBM 3033 mainframe at the company's headquarters here, uses the device at 58 catalog showrooms, which are equipped with in-store POS nets ranging in size from four to 16 terminals.

The catalog showrooms, which Gordon is in the process of selling, See **Gordon** page 14

How much time users spend monitoring their networks



DATA DIALOGUE

PAUL KORZENIOWSKI

Vendors hype more than deliver

Users interested in T-1 multiplexers were treated to the latest in "hot air ware" at the Communication Networks '87 Show recently held in Washington, D.C.

On the show floor, sales and marketing managers touted product capabilities, even though many of the most interesting features have not even seen the light of beta testing.

Unfortunately, preannouncing products is nothing new in the T-1 arena. About three years ago, a number of venture capital-backed, start-up companies burst on the scene. These companies were talking about multi-node products before they designed and delivered a single point-to-point T-1 multiplexer. Since that time, preannouncing products has become common practice in the T-1 market.

Why are vendors rushing to announce products before they are ready for market? Vendors say customers have long purchase cycles, requiring sellers to make their intentions known well in advance. In order to bid on a contract that may be awarded in December, vendors have to announce future enhancements today.

To a degree, that's true. But there's another factor that may be more important. Analysts say there are too many vendors vying for a relatively small, roughly \$200 million market. Analysts expect the market to grow at an

exponential rate, with much of the growth coming at the high end of the market.

Events during the coming months are expected to determine which vendors will still be in business three to five years from now. Thus, many vendors are trying to position themselves now as the leading T-1 multiplexer supplier.

This jockeying does not help users facing a purchase decision. Managers are being deluged with a flood of product claims. Separating real functionality from marketing hype is becoming a full-time job.

When purchasing a modem or low-speed multiplexer, users do not have to be concerned with matters such as the vendor's financial stability. In the T-1 market, these items matter more.

In addition to checking product features, users would do well to talk with the venture capitalists backing various start-up companies. Users should try to determine just how committed the investors are to the company before signing a contract.

Also, references ought to play a critical role in the selection process. Users should ask for a reference for each feature they plan to use. If the vendor can't supply such references, the buyer must determine whether or not his company should be the one to test the capability.

Vendors ought to consider their claims more carefully. T-1

multiplexers have a long buying cycle, and some users spend more than six months evaluating all of the various proposals.

If a company wants to discuss untested features in a request for proposal, it should list them and have the customer sign a nondisclosure agreement. But vendors shouldn't announce products until they are ready to ship them.

Premature product announcements can be costly. Beta testing often turns up shortcomings that never cropped up during development. Companies are fooling themselves if they believe a two-month beta test will uncover all the bugs in a product that may have taken three years to bring to market.

They are also fooling themselves if they think premature announcements go unnoticed. Failure to deliver a product on time can undermine customer faith in a vendor.

Is the perception that a company is a market leader really an important buying consideration? Before installing a T-1 network, a user will sift through the hype to find actual delivered product capabilities.

Satisfied customers, not marketing hoopla, sway users from one vendor to another. If vendors paid more attention to satisfying customer requirements and less to worrying about what their competitors are doing, everyone would benefit. □

► SURVEY RESULTS

Users note low-speed line needs

Study says protocol analyzers will sell.

BY JIM BROWN
New Products Editor

EXTON, Pa. — The majority of protocol analyzer users are looking for a device capable of supporting line speeds between 9.6K bit/sec and 64K bit/sec, according to a survey released here by the Schubert Research Group.

Schubert contacted 200 protocol analyzer users and buyers from a list of 1,600 names supplied by trade publications. The list was drawn from readers who submitted reader response cards and expressed an interest in protocol analyzers.

When asked how protocol analyzers were used, 42% of the respondents said for technical and network control, 30% named software development, and 24% cited field service and remote testing.

Schubert said 72% of the respondents fell into the category of those who use a protocol analyzer and make buying recommendations to management. The remaining 28% were users with no buying decision power.

Based on brief interviews with those users, the survey found 25% were looking for a device capable of supporting line speeds of 56K. See **Survey** page 14

Survey from page 13

bit/sec. The second most frequently mentioned speed, with 22% of the total, was 19.2K bit/sec.

Only 7% expressed an interest in protocol analyzers that support T-1 speeds of 1.5M bit/sec, while 6% were looking for support of speeds above 1.5M bit/sec.

Fifteen percent of the users said they wanted a device supporting speeds of 9.6K bit/sec, while 5% of the respondents were looking for support of line speeds under 9.6K bit/sec. Speeds of 64K bit/sec were desired by 10% of the respondents.

The survey also found 53% of those contacted intended to purchase a protocol analyzer this year, while 33% said they did not intend to make such a purchase. The re-

maining 14% were uncertain whether or not they would make a new purchase this year.

When asked to name which firm they had purchased protocol analyzers from since 1983, some 32% of the respondents named Digilog, Inc. Hewlett-Packard Co., which was named by 22% of the respondents, finished second.

Some 17% said they bought an Atlantic Research Corp. product, while Halcyon Communications, Inc. and Northern Telecom, Inc.'s Spectron division each were named by 9% of the respondents.

Tekelec, Inc. was named by 7%, while Navtel, Inc. and Digitech Industries, Inc. together accounted for the remaining 3% of the purchases. **□**

Gordon from page 13

market jewelry, electronics and housewares. Gordon's remaining outlets are equipped with a single POS terminal, and they sell only jewelry.

Using IBM's mainframe-resident software known as Advanced Data Communication for Stores and also Racal-Milgo, Inc. 2,400 bit/sec modems, Gordon polls each of its locations nightly over dial-up connections and collects daily sales and inventory data.

Some 20 lines of the company's AT&T System 75 private branch exchange are programmed to initiate calls to the stores over predefined least-cost routes according to a specified schedule.

The in-store networks consist of

IBM 3683 slave POS terminals reporting to an IBM 3684 master POS terminal. Slave terminals are daisy-chained together with the master as the start and stop site.

Each slave POS terminal receives control information from the master and passes transactions to the master, which records the day's sales activity on a diskette.

Master POS terminals cut off communications with slave POS terminals at a specified time and establish a communications link that puts the in-store modem in autoanswer mode to await the call from Houston.

The information collected from each site is sorted on the Houston mainframe and passed to the proper client systems. According to Jim Edwards, Gordon's manager of POS systems, mainframe-resident software examines inventory data and automatically generates purchase orders when items reach critical levels.

"As soon as a transaction comes through saying we've sold an item we know we want to keep at each store, we generate a purchase order or an in-house transfer from one of our vaults out to the store and replenish the item without having the store manager fill out any paper work," Edwards said.

Another advantage of a POS network is more accurate pricing, Edwards said. The host system downloads a pricing file to each store each day; then cashiers enter inventory numbers into their POS terminals, which search the data base to find the correct price.

Edwards said Gordon relies heavily on the Loop Diagnostic Panel (LDP) manufactured by Datatec Industries of Englewood, N.J. A break at any point of the network loop, whether it is caused by a failed communications card, a wiring problem or a failed terminal, causes the entire network to halt. But the LDP quickly locates the terminal responsible for the failure.

Edwards says that although the LDP is used occasionally to test the network operation, it is primarily used when the loop is broken.

An operator at the LDP takes all the terminals on the loop off-line. Then each terminal is sequentially placed back on-line. The terminal that fails to light a loop indicator is most likely the problem terminal.

The alternative, Edwards said, is to have someone go to each terminal, unplug it from the loop and insert a loop indicator plug until the problem terminal is located.

"Imagine a store manager or someone running around and climbing underneath the terminal trying to unplug it from the loop and plug in a little test device," Edwards said.

"I can't say I've had a single problem with the LDPs since they were installed two years ago," he said. "They have certainly been worth the price we paid for them."

According to Edwards, Gordon learned of the LDP from Post-Tron Systems Corp. of Providence, R.I., which customized the Gordon POS software. The LDPs and all of Gordon's POS terminals were installed by Data-Tek, Inc. **□**

Responsible for connection, monitoring and control of data communications networks?

Try this network quiz.

- | | | | |
|--|---|---|---|
| 1. Does your present network allow interconnection of <u>all</u> your data devices? | Yes No
☐ ☐ | 3. Is your user interface simple enough and management info complete enough that the "HELP" phone is rarely needed? | Yes No
☐ ☐ |
| 2. Is performance—throughput and resource usage—at optimum levels? | Yes No
☐ ☐ | 4. Can you add devices without a network SYSGEN? | Yes No
☐ ☐ |
| 5. Is your current network architecture an "open" one that prepares you for the current move toward standardization? | Yes No
☐ ☐ | | |

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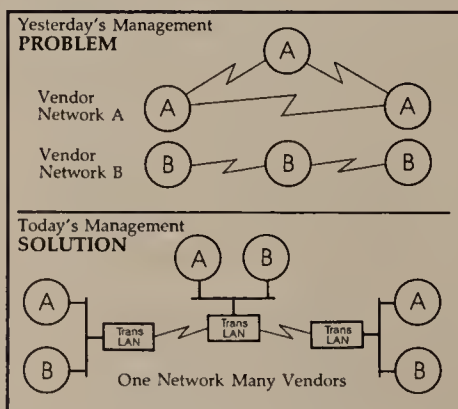
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LOCAL NETWORKING

“Right now, frankly, LU 6.2 is not needed in the marketplace. It’s a great piece of vaporware.”

Aaron Goldberg
Vice-president
Microcomputer services
International Data Corp.

► SURVEY

Small scale LANs leave PCs lonely

Study shows most micros remain unlinked.

BY PAULA MUSICH
Senior Editor

Although most Fortune 1,000 organizations have installed local networks, the vast majority of personal computers in these corporations remain unconnected, according to a recently released International Data Corp. study.

In a survey of nearly 70 Fortune 1,000 companies and U.S. government agencies, the Framingham, Mass.-based research company found that 73% had at least one local network installed. The average number of networks installed at these companies was 7.6. Despite the acceptance of local nets, only a handful of these organizations said that more than 20% of their personal computers were linked to local networks.

The study characterized typical Fortune 1,000 network installations as either small personal computer networks or networks that link a number of terminals to one or

more minicomputers. Most of the installed personal computer networks were either pilot networks set up by MIS or small departmental networks used for electronic mail or peripheral sharing.

“The MIS mentality is, ‘Let’s bring in a small network and test it before we invest a lot of money in a larger installation,’” said IDC analyst Lee Doyle. “Conversely, smaller departments that don’t have large budgets are buying small networks for specific applications.”

Among the companies with installed networks, no one local network vendor held a dominant position. Novell, Inc. garnered the largest number of installations, accounting for 13% of the networks installed at user sites. 3Com Corp. followed with 9.5% of the installed networks, Wang Laboratories, Inc. had 7.5%, and Xerox Corp. had 6%.

Although IBM has been shipping its Personal Computer Token-Ring adapters for

See **Local** page 16

Fortune 1,000 local net user survey

What type of network do you have installed?

Vendor/Network	Number of networks installed	Percent installed
Novell, Inc./NetWare	50	13.0%
3Com Corp./EtherSeries/3+	36	9.5
Wang Laboratories, Inc./Wangnet	28	7.5
Xerox Corp./Ethernet	22	6.0
IBM/Token-Ring Network	21	5.0
Apple Computer, Inc./AppleTalk	20	5.0
Ungermann-Bass, Inc./Net/One	18	5.0
AT&T/Starlan	15	4.0
Digital Equipment Corp./DECnet	11	3.0
IBM/PC Network	8	2.0
Other/don't know	150	40
Total	379	100%

What is the most important application of your network?

Application	Number
Electronic mail	10 (19.6%)
File/information sharing	6 (11.8)
Pilot	4 (7.8)
Document transfer	4 (7.8)
Budget	3 (5.9)
Resource sharing	3 (5.9)
Mainframe access (gateway)	3 (5.9)
Data collection	2 (3.9)
Document storage and retrieval system	1 (2.0)
Multuser software	1 (2.0)
Didn't answer/don't know	14 (27.4)
Total	51 (100%)

SOURCE: INTERNATIONAL DATA CORP., FRAMINGHAM, MASS.

LANMARKS ERIC KILLORIN

Apple's small step

Apple Computer, Inc.'s announcement of its own file server and IBM Personal Computer Card for its Macintosh-based network, AppleTalk, was touted as a significant event in the local-area network industry.

AppleShare and the AppleTalk PC Card, by themselves, would scarcely be regarded as important had they not been introduced by a firm with so much at stake in the Fortune 1,000 marketplace. AppleTalk support over the past two years can best be characterized as spotty.

Since Apple began making noises about network support for its workstations, the industry has watched and waited. During Apple's inactivity, a few third-party vendors announced disk servers and applications

software for the AppleTalk environment.

More notably, desktop publishing vendors saw the shared LaserWriter environment available through AppleTalk as a means to capture users. By sheer accident, AppleTalk sold well, despite its lack of information-sharing capabilities, because its primitive networking capabilities were all that was necessary to support the exploding market for shared laser printers and page description programs. The desktop publishing market made AppleTalk a moderate success.

Could Apple have survived on printer sharing alone? Could Apple have convinced MIS managers at Fortune 1,000 businesses that the appeal of Apple's workstations is enough to justify bulk purchases? Hardly.

If Apple is to compete with IBM, Digital Equipment Corp. and Apollo Computer, Inc., it must provide capable communications paths to these vendors'

equipment. That means file transfer and electronic mail functions with IBM Personal Computers, departmental systems and centralized host systems. It also means support for commercial, laboratory and office applications. And it means conformance with communications software standards beyond mere terminal emulation.

Although the Apple products still aren't shipping, the outcome of the network selection process is all but assured. The market is solidifying around Fortune 1,000's networks of choice: Ethernet, Token-Ring and cable television.

If Apple wishes to move from being a personal computer vendor to a system vendor, it must think less about ease of use and a screen full of icons and more about powerful business applications processing across multiple domains, network architectures and different classes of processors. ▮

► STANDARDS

TCP/IP fills need in OSI interim

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — While the federal government has thrown its weight behind emerging international communications standards, vendors are still predicting success for products based on the more established Transmission Control Protocol/Internet Protocol.

Ungermann-Bass, Inc., a relative newcomer to the TCP/IP market, is one such vendor. The Santa Clara, Calif.-based local network vendor entered the TCP/IP market last October, but not before assessing the impact the government's Open Systems Interconnect migration would have on its business, according to Bart Burstein, product marketing manager at Ungermann-Bass.

“We held off introducing Net/One TCP-PC when we learned of the federal government's planned See **TCP/IP freedom** page 16

Killorin is the publisher of “Netline,” an industry newsletter on computer networks, a publication of Hyatt Research Corp. in Andover, Mass.

TCP/IP from page 15

migration to OSI-based products. Despite that move, we think we have a five-year window on the TCP/IP market. OSI standards are still in development, and it's going to be several years before OSI-based products are available to the general marketplace," Burstein noted. "In the meantime, TCP/IP users are going to need our products."

The Jet Propulsion Laboratory and the John von Neumann Center at Princeton University are two users of the Ungermann-Bass TCP-PC product, which consists of a board and software that allow an ordinary terminal or personal computer to communicate with other TCP/IP-based systems.

The product allows a terminal user to access supercomputer centers around the country by using the TCP/IP protocol suite.

Even with the government's commitment to OSI, TCP/IP still figures prominently in the plans of various federal users. For example, the U.S. Air Force refrained from buying communications software while developing a unified communications architecture that will influence most future purchases. The Air Force specifications named TCP/IP as the communications protocol to be implemented in all future systems.

Even if TCP/IP eventually disappears, it will have served users well. "There are 75 hardware vendors and 35 software vendors in

the TCP/IP market. Today, the TCP/IP environment provides users with a high degree of interoperability among these vendors' products. This should teach users to expect and demand the same degree of interoperability in the OSI environment," Burstein said.

The development of TCP/IP was driven largely by the Department of Defense and the creation of the Advanced Research Project Agency Network, a nationwide network connecting supercomputer and scientific research centers around the country. TCP/IP is also the protocol used in NSFnet, a national network funded by the National Science Foundation that also connects research centers around the country. □

Local from page 15

less than a year, some 21 Token-Ring networks were in place at 10 of the organizations surveyed. All of the Token-Ring nets were MIS pilot installations linking between eight and 15 personal computers.

The study found that users rated electronic mail as the most important application on their networks. While previous studies have found that users bought local networks primarily to share expensive peripherals, Doyle maintained that this has changed because of declining peripheral costs. He also pointed out that once a network is installed, users realize productivity gains by sharing information through electronic mail and file transfer capabilities. "Tying small groups together really changes the way people work," he said.

The study found users lamenting the lack of good multiuser software for local networks. Few users said their personal computer networks currently run multiuser applications, despite the fact that IBM's Network Basic I/O System, an emerging standard interface for personal computer networks, has

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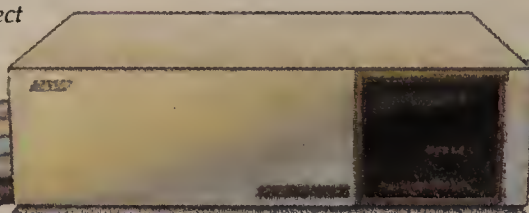
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More ways to help computers do more.

Only 15% of the respondents said they believe that personal computer networks are an effective substitute for departmental minicomputers.

been available to applications developers for more than a year.

"Major players such as Ashton-Tate and Lotus [Development Corp.] haven't gone out on a limb to push the market," Doyle said. "User perception of Ashton-Tate's first effort was that it was a terrible multiuser application. There were a lot of bugs in the software—the kind of things you see with new software."

Some 40% of the organizations with networks reported that at least one of their nets offered gateway access to a larger system. Seventeen companies had 3270 gateways to IBM hosts.

Although vendors contend that personal computer networks provide for a more effective distribution of computing resources, only 15% of the respondents said they believe that personal computer networks are an effective substitute for departmental minicomputers. Said one respondent, "Network speed, data integrity and centralized network management functions are not mature. Applications software does not take full advantage of local net capabilities." □



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COMMUNICATIONS MANAGER

“In the old days, telecommunications people were thought of as little old operators who stood in elevators and spread gossip. Our main job is to make people realize we’re here to help them.”

Sam Triplett

Vice-president, telecommunications
First Florida Bank, N.A.

► FAST TRACK

What it takes to make it in the Fortune 500

BY BOB HAMEL
Senior Editor

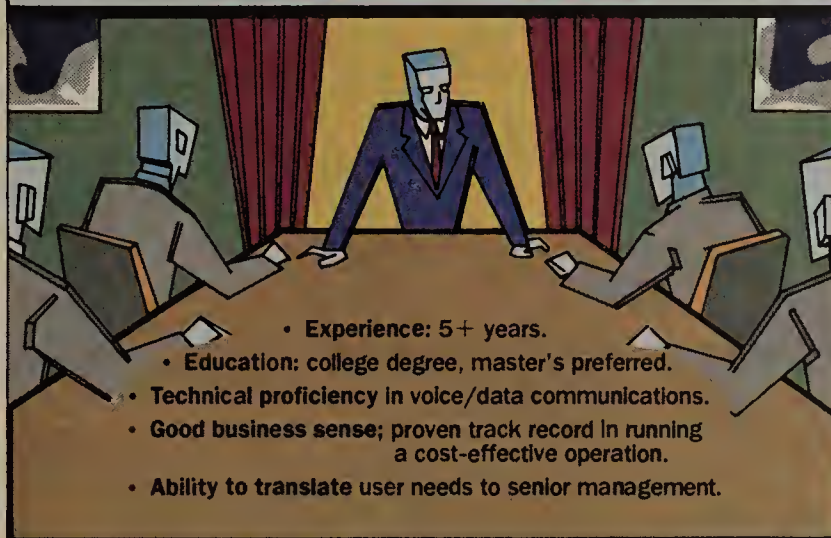
To be a telecommunications manager in a Fortune 500 company, you’d better have sharp corporate political skills, be able to bring new ideas to fruition and feel at home with senior management and budgetary analyses, according to executive search and placement firms.

Although their advice varied, the headhunters concurred that Fortune 500 companies are stressing management skills over strict voice and data knowledge.

A healthy knowledge of the workings of corporate politics is a must. “If you’re dealing with senior management, you have to be a good politician. It comes with the territory,” said Gloria Field, president of the Needham, Mass.-based G.A. Field Personnel Consultants.

See **Fortune** page 18

Ideal qualities of a Fortune 500 communications manager



GUIDELINES ERIC SCHMALL

Consultant: not necessarily an enemy

Few things boil the blood of communications managers faster than an upper management suggestion to bring in an outside consultant to study communications cost reduction.

Most managers regard consultants as intrusive, hostile forces. The manager and his staff are, after all, charged with the research, implementation and efficient operation of the communications function.

But even established communications departments can benefit from outside consultants. A consultant can be instrumental when the organization needs to perform an especially large and difficult task, such as a review of communications patterns, which would take months of focused activity.

Similarly, consultants may fit the bill for organizations that have little time to study and implement a new technology that exceeds the existing staff's depth of experience or technical familiarity.

Anxiety bubbles up, howev-

Schmall is network systems manager for an insurance holding company.

er, when senior management entertains the notion that a consultant might be helpful in reviewing the overall communications operation. This naturally raises territorial instincts. To the communications manager, it appears to be an audit conducted by outsiders designed to point out damaging shortcomings of the current operation.

In fact, more often than not, consultants sell senior management by promising massive cost savings. Consultants typically toss around astronomical sums — \$250,000 or \$500,000 — that they estimate their work has saved former clients. The decision makers instinctively rise to that bait like hungry freshwater trout. Making a small but critical inductive leap, management naturally wonders what miracles these experts might work within their own corporations.

At this crucial juncture, the organization must involve the opinion of the communications manager. He alone knows his operation's strengths and weaknesses, its cost-savings opportunities and its strategic and tactical directions. If the

communications department is shut out of the decision-making process, senior management will be creating a combustible combination: a consultant's services dumped into the lap of an unwilling and hostile communications department.

Among the toughest tasks for a communications manager is the dispassionate evaluation of the question, “Do we need a consultant?” If the manager denies that such services are needed, he will be accused of being too sensitive about his turf.

On the other hand, if the manager is overjoyed about bringing in a consultant, it will seem he is admitting the operation is in some kind of bind.

To find a sensible middle course that avoids these perceptions, the manager needs to stay objective in probing the specific needs of his organization.

Once a need is determined, the communications manager must insist on questioning not only what a consultant's role will be but also whether this particular consultant is best for

See **Consultants** page 18

SEMINARS

On March 9 and 10, New York University will offer a seminar entitled “Telephone Alternatives and Decisions.” The seminar is designed for communications managers and explores alternatives for local, long-distance and private network services. Speakers will also focus on future telecommunications developments. Registration is \$695. For information and telephone registration, call (212) 580-5200 or (212) 605-0162.

Advanced Systems, Inc. (ASI) introduced a new video course dealing with local networks. The four-hour course is intended as an introduction to the concepts and jargon of local network communications. The course describes how networking can solve business problems and highlights local-area network publications, networking limitations, purchasing considerations and cost elements.

For additional information, contact a local ASI sales office or Advanced Systems, Inc., 155 East Algonquin Road, Arlington Heights, Ill. 60005 or call (800) 238-2626.

Timeplex, Inc., the Woodcliff Lake, N.J.-based network equipment manufacturer will hold an “Educational Seminar on T-1 Facilities and Networking,” March 18 and 19 in New Orleans. In addition to covering the history of T-1, the seminar will discuss multiplexing, the integration of voice and data, standards and compatibility.

The seminar costs \$795, including meals and course materials. To register, call (201) 930-4600 or write Timeplex Seminars, Timeplex, Inc., 400 Chestnut Ridge Road, Woodcliff Lake, N.J., 07675.

Telecommunications auditing techniques will be the topic at a one-and-a-half-day hands-on conference sponsored by the publishers of the “Telephone Angles” newsletter. The conference, slated for March 30 and 31, will be held at the Sheraton Crystal City Hotel in Arlington, Va. Bruce Thatcher, president of TelCon Associates and a leading telecommunications auditing consultant, will lead the conference.

The registration fee is \$495 and does not include hotel room. “Telephone Angles” subscribers are entitled to a \$50 discount, and multiple registrations are entitled to further discounts. Registration fees are payable in advance and should be sent to “Telephone Angles,” 4550 Montgomery Ave., Suite 700N, Bethesda, Md. 20814-3382. Contact Ann Weinberg at (301) 656-6666 for additional information. □

Fortune from page 17

Technical expertise, although important, is not critical. "You don't have to be a bits and bytes technician in that position," said Stephen Page, a principal of Page-Wheatcroft & Company, Inc., an executive search firm based in Dallas.

Jay Jacobsen, president of Personnel Resources, a New York-based telecommunications placement agency, agreed. "Not knowing what to do with a screwdriver or being unable to read a schematic is accepted as long as the manager is good at budgets and can provide a return on telecommunications investments."

Jacobsen said managers must be good salesmen for their departments. Convincing senior manage-

ment to use the services of the telecommunications department for more than just an internal telephone system is critical. "They have to convince top management that every dollar spent on telecommunications will result in company revenue," Jacobsen noted.

In his dealings with executive recruitment, Page said Fortune 500 companies generally require a manager to have a master's degree as well as a pragmatic understanding of business. "Managers are now held more accountable for their budgets and need to exert a greater

level of control than before AT&T divestiture," he added.

In addition to an education, strategic planning and creative use of telecommunications systems will put managers on top, Jacobsen noted.

"To succeed, they may bring ideas to top management, like putting terminals on the customers' or suppliers' premises," he said.

The telecommunications manager can drastically affect the marketing and distribution efforts of a company. "The days of being just a voice and data man laying out the wiring for systems and sites are over," Jacobsen said.

Although it wasn't mentioned as a top requirement, competence in keeping telecommunications systems functioning is also important. "Supporting the needs of the users within the corporation and providing the highest quality of service in the most cost-effective manner is necessary," Page said.

The future does not bode well for AT&T veterans. "A lot of end users don't want former AT&T guys," Field said. "Because they've been in a regimented environment, they often aren't prepared for working with new technology in a new atmosphere."

Technicians trying to land management slots also face an uncertain future. "The emphasis is on a prospective manager having already developed the skills he will need in a new position," Page stated. "Top companies don't want someone who wants to be a manager; they want someone who has proven managerial experience."

Field indicated that the demand for telecommunications managers, especially in the Boston area, has dried up. "Right after divestiture, there was a lot of activity, but things have died down," she said. According to her, there are opportunities in cities such as New York. Others concurred, mentioning San Francisco and Dallas as areas where opportunities exist.

Where available, telecommunications management positions can pay a salary of \$50,000 and up, depending on the company.

Bringing fresh ideas to telecommunications appears to be the raison d'être for bringing in a new manager. As companies centralize their communications systems, they are in need of innovative approaches. Often that means bringing in new people. **□**

Consultants from page 17

the job. The manager needs to establish himself as an important evaluator of the consultant's competence and potential usefulness. This means investigating the consultant's client background and finding out about the so-called savings.

Through this diligent research, the communications manager will be providing the organization with the facts it really needs to evaluate whether it can use outside help. For the good of the overall operation, the manager must transform himself into a consultant on consultants. **□**

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Dialog Information Services, Inc.	VU/TEXT Information Services

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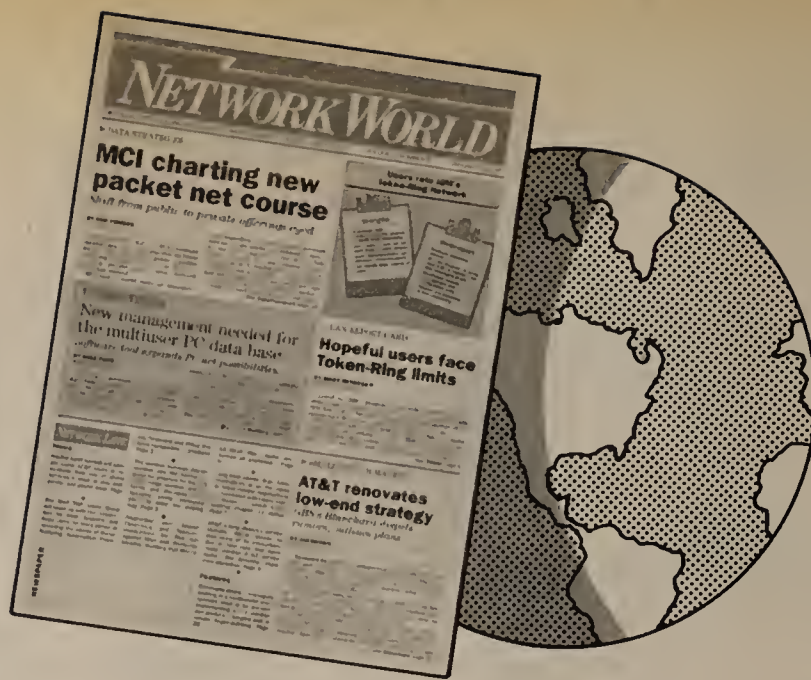
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As networking takes over the world, Network World takes over the market.

The trend has never been clearer. Networking is now the major application market for communications. And a recent statement by Ken Olsen, President and Founder of Digital Equipment Corporation, substantiates this trend: "We have to start thinking of the computers as peripherals. You start with the network, then you hang the computers on later."

Networking. It's been *Network World's* focus from the very start. In fact, it is the *only* publication that covers the entire realm of communications from the networking point of view. And in doing so, *Network World* has established itself as the *standard* for communications users already networked or planning to network.

Today's users know they need up-to-date information in order to keep pace with the evolving world of networking.

That's why they read *Network World*. And that's why *Network World* was the only publication to gain in regular readership in an independent study conducted among ICA (International Communications Association) members, some of the nation's most influential buying decision-makers for voice and data communications products and services.

The study, sponsored by a multi-billion dollar networking company and conducted in January 1987 by First Market Research of Boston, showed decreased readership of all communications-oriented publications among ICA members since a previous study in July 1986. Only *Network World*, with its exclusive networking-oriented coverage, experienced an increase in regular readership. The percentage increase/decrease for each publication over that six-month period is displayed in the following chart.

Percentage Change in Regular Readership* among ICA Members
(July 1986 vs. January 1987)



*Regular readership is defined as reading three or four issues out of the last four issues of a given publication.

Source: Two independent studies, each sponsored by a multi-billion dollar networking company and conducted among ICA members by First Market Research of Boston, July 1986 and January 1987.

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NEW PRODUCTS AND SERVICES

See inside for:

- ▶ Gandalf adds dial-back security
- ▶ Net link for Banyan servers
- ▶ Enhanced Telex PBX

▶ MULTIVENDOR NETWORKING

Jupiter mini serves as multifunction front end *System 1000 links incompatible systems.*

BY JIM BROWN
New Products Editor

WALTHAM, Mass. — Jupiter Technology, Inc. recently introduced its System 1000 data communications system, which uses proprietary software to enable incompatible computers to communicate.

The System 1000 is a minicomputer operating at speeds up to 14 million instructions per second. It is tailored to run communications applications that connect computing devices. Using software modules, it reportedly can perform concurrently such functions as data concentration, host port contention, multiplexing, dynamic data switching, packet assembly/disassembly, packet switching and protocol conversion, and such applications as message processing, document interchange and queuing.

Currently being beta tested at Fidelity Investments in Boston, the System 1000 uses a series of processors, including a central system processor, a series of I/O processors and communications processor boards. A fully configured System 1000 supports 624 lines spread

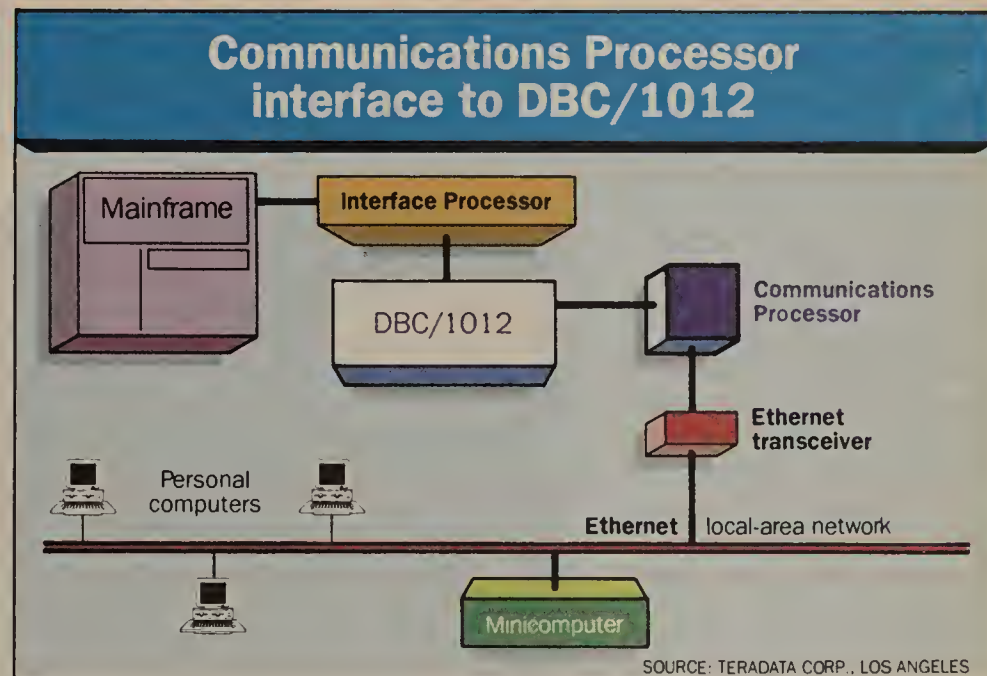
across 13 I/O processors. The System 1000's Communications Interface boards come with RS-232, RS-422, V.35 and Ethernet interfaces. Jupiter said the device is designed for large companies with the staff and the expertise needed to customize the System 1000.

"The System 1000," said James Flach, Jupiter's president and chief executive officer, "is designed to do a lot of real-time processing, make a large number of connections dynamically and process data in real time along those connections."

Jupiter implements its own Motorola, Inc. 68010 two-board central processor design running under the Unix-based Jupiter Host Operating System (JHOS). The JHOS oversees system administration, setup, network management and system reporting. It is also used to access Jupiter's communications processing operating system Softlink, which resides on the Motorola, Inc. 68000 microprocessor-based I/O processor.

Connected to the system processor over a VMEbus, the I/O processor implements a Softlink Language Interpreter that allows the JHOS to

See **Jupiter** page 25



▶ COMMUNICATIONS PROCESSOR

Teradata COP gives LAN link

BY JIM BROWN
New Products Editor

LOS ANGELES — Teradata Corp. recently unwrapped a communications processor that supports access to its DBC/1012 data base computer from personal computers and minicomputers attached to an Ethernet local-area network.

Teradata's Intel Corp. 80286 mi-

croprocessor-based Communications Processor (COP) complements the DBC/1012 Interface Processor, which attaches the DBC/1012 directly to a mainframe's block multiplexer channel. With the COP and the Interface Processor, terminal and personal computer users can share a common data base.

Prior to the COP, personal computers and minicomputer-attached terminals had to establish a mainframe session in order to connect to the DBC/1012, making the mainframe act as a cluster controller and data base file server.

"The mainframe tends to be one of your more expensive file servers. The COP allows an alternative path to the DBC/1012," claimed Boyd Pearce, vice-president of marketing for Teradata.

The \$39,000 COP establishes and controls up to 64 concurrent sessions between personal computers and the DBC/1012 over an Ethernet network that supports the Transmission Control Protocol/Internet Protocol or the International Standards Organization's Open Systems Interconnect model.

COP-resident communications protocol software supporting an average throughput of 100K bit/sec from the DBC/1012 to the COP is priced at \$4,000.

Pearce said the firm will announce support for the Xerox Network System protocol and the Manufacturing Automation Protocol later this year.

Designed as a central data repository, the parallel processing

See **COP** page 25

▶ DIGITAL SWITCH

ISOETEC PBX aimed at 100-line mart

BY JIM BROWN
New Products Editor

DARIEN, Conn. — A 228-port nonblocking digital telephone system and a voice mail product were introduced recently by ISOETEC Communications, Inc.

The firm's System 228 is expandable in increments of 12 ports up to a total of 228. Aimed at the crowded under-100-line telephone market, the system reportedly supports data switching as well as telephone service.

Providing a voice bus with 240 time slots, 228 of which are for voice connections, the System 228's data switching supports asynchronous and synchronous communications. With the data communications option, the System 228 supports concurrent

voice and data transmission by providing stations with two digital channels, one for voice and one for data. A display telephone set supports data communications over an RS-232 link.

The system supports four different digital telephone models equipped with speakerphones and six feature keys. They include a 29-key display telephone set, which serves as an attendant and system programming console, a 28-key set with 22 programmable feature keys, a 17-key set with 11 programmable keys and a 6-key feature phone.

The system also supports the analog sets used on ISOETEC's System 96 and System 120. Printer and shared modem connections are added features of the System 228.

The system offers such software-controlled options as automatic call distribution, least-cost routing, call accounting, account codes, an attendant terminal and a voice mail system.

Attendant and programming terminals attached to the Motorola, Inc. 68000 microprocessor-based system support call processing, extension status, line status, date, time, group usage and a directory of extensions. Four System 228 I/O ports can be configured to support multiple operator or programming terminals as well as station message detail recording equipment.

The system software is contained in 384K bytes of erasable programmable read-only memory. The system also features 32K

See **ISOETEC** page 25

Products & Services

Banyan supports voice/data net

Banyan Systems, Inc. announced its BNS and DTS virtual network servers will attach to an integrated voice/data local-area network as well as support 3Com Corp.'s EtherLink+ and Proteon, Inc.'s ProNET-4 local-area network adapter cards.

The firm said it supports connection of a David Systems, Inc. David Information Manager to its BNS or DTS servers. The David Information Manager allows telephones and personal computers to connect to a single twisted-pair wire, which will support concurrent data and voice transmission.

Banyan's servers will bridge David Information Manager-connected devices to devices attached to other networks supported on the server.

In addition, Banyan said its BNS and DTS servers will now be able to support Proteon's P1344 and P1340 network adapter cards used with its ProNET-4 4M bit/sec token-ring local-area network.

*Banyan Systems, Inc.
115 Flanders Road, Westboro, Ma. 01581 (617) 898-1000.*

V.32 modem features trellis modulation

Anderson Jacobson, Inc. released a V.32 modem featuring trellis-coded modulation and automatic dial-back capability.

The **AJ 9631-S** operates in full-duplex at speeds up to 9.6K bit/sec over two- or four-wire dial-up and leased lines. The firm claims the unit will also operate with satellite transmissions. Featuring an integral V.25bis synchronous autodialer, the modem stores a list of alternative phone numbers in nonvolatile memory and calls them in sequence until a connection is made. Supporting down-line loading of modem settings and three security levels, the unit also establishes a dial-up connection when leased-line quality degrades. The microprocessor-based modem also supports standard loop-back and end-to-end diagnostics.

Both stand-alone and rack-mountable versions of the AJ 9631-S are priced at \$2,995.

*Anderson Jacobson, Inc.,
521 Charcot Ave., San Jose,*

Calif. 95131 (800) 423-6035.

Dial-back security added to switch

Gandalf Data, Inc. released a software-based dial-back security feature

for users of its PACX 200 and PACX 2000 networking systems.

Compatible with dial-up modems, the package requests users dialing into the switch to declare a password. The package searches its memory for that password and dials back the

user's location. Once dial-in access is allowed, additional levels of security may be implemented before the user can access other resources on the network. The package will support a directory of 256 phone numbers on the PACX 200 and 1,024 phone numbers

on the PACX 2000. Successful and unsuccessful access attempts are logged by the package and accessed from the switch's listing port.

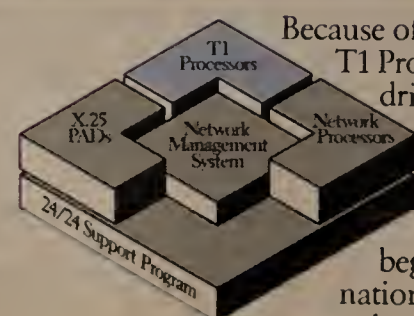
The package costs \$3,000.

Gandalf Data, Inc., 1020 South Noel, Wheeling, Ill. 60090 (312) 541-6060.



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Because of the DCA System 9000 T1 Processor's software-driven, "building block" modularity, your T1 voice/data network can grow from a small two- or three-site beginning, to a powerful nationwide, multi-node mesh network of any size or complexity.

Products & Services

Telex upgrades its PBXs

Telex Computer Products Inc. released enhanced software for its 1001 line of digital voice/data private branch exchanges as well as a new central processor for its larger PBXs.

Software Release 6.3 increased the standard asynchronous data transmission rate supported by Telex's basic 1001 telephone to 4.8K bit/sec. The package will also support higher speed asynchronous data devices operating at up to 19.2K bit/sec. The en-

hanced software also accommodates the equal access ruling.

Telex also announced a new processor providing increased speed for its M and L model PBXs. Using an Intel Corp. 80286 microprocessor, the system is supported by a 20M-byte

hard disk and 1.2M-byte floppy drive. It reportedly does not require a separate module for data storage, thus freeing cabinet space for up to 80 more trunk circuits.

The cost of upgrading to software Release 6.3 starts at \$1,000, plus \$25 per line.

Upgrading to the new processor costs \$3,500.

Telex Computer Products, Inc., 6422 E. 41 St., Tulsa, Okla., 74135. (918) 627-1111.

Audio bridge for leased lines

Anderson Jacobson, Inc. introduced an audio bridge that makes possible switched network multipoint operations.

The **AJ 8601-MB** allows central site leased-line modems with automatic dial backup to use switched lines for unattended dial backup in multipoint applications.

The rack-mountable bridge gives multipoint nets fail-safe data transfer over leased lines with automatic switched network dial backup operation.

Each AJ 8601-MB supports up to eight slave modems, and two bridges can be daisy-chained to support up to 15 drops.

When a slave modem senses signal loss or degradation, it enters dial backup, calling the bridge's receive line. The bridge verifies which slave is calling in, drops the line and places two calls back to the slave modem to establish the switched connection. Dial backup from the central site can also be initiated manually.

The microprocessor-controlled front-panel switches store two telephone numbers of up to 36 digits each for each slave modem and control connection of lines to them.

The AJ 8601-MB is available immediately and is listed at \$2,995.

Anderson Jacobson, Inc., 521 Charcot Ave., San Jose, Calif. 95131 (800) 423-6035.

Token-ring interface unveiled

Proteon, Inc. added a token-ring network interface to the company's line of multiprotocol, multi-network routers.

The IEEE 802.5-compliant product permits connection of token-ring networks beyond personal computer environments into other networks.

The **p4210** interface plugs into Proteon's p4200 Gateway, which supports Ethernet, Advanced Research Project Agency Network, T-1 and 56K bit/sec. See **Proteon** page 24



Without ever obsoleting your original investment in hardware or software! And our adherence to industry standards ensures orderly growth *without surprises*—all the way to T3 and ISDN.

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Products & Services

Proteon from page 23

wide-area networks, as well as Proteon's own line of token-ring networks.

The intelligent router allows transparent multiprotocol communications over any combination of transmission media.

Pricing

The p4210 is available now and is priced at \$3590.

The price includes software support.

Proteon, Inc., 2 Technology Drive, Westboro, Mass. 01581 (617) 898-2800.

RJE package runs in background on PC

Systems Software Marketing, a Sterling Software division, released enhanced personal computer software supporting remote job entry (RJE) and file transfers between personal computers and mainframes as a background application.

PC-Tracs 3770 AF runs on any IBM Personal Computer, XT, AT or compatible with PC-DOS 2.0 or a later version, 256K bytes of random-access memory, a Synchronous Data Link Control communi-

cations adaptor and a modem. The package emulates IBM 3770 RJE functions in a Systems Network Architecture environment and transfers files at speeds of up to 19.2K bit/sec over dial-up or leased lines.

The package allows unattended operation, enabling mainframe data to download automatically at specific times while operators continue to process another application. Compacted data collected from the mainframe may be directly written to the personal computer disk file or printed.

PC-Tracs 3770 AF costs \$795 and is available immediately.

The company also released an IBM 3270 software communications emulator for use in the same environment. **PC-Tracs 3270 Version 3** emulates an IBM 3274 controller with a 3278 or 3279 terminal attached and one or two 3287 printers. The product allows the personal computer to access the mainframe in background mode, while the user runs other functions or applications in the foreground.

The software communicates in an IBM VTAM/TCAM environment, and an optional applications programming interface is available for customized applications.

PC-Tracs 3270 Version 3 is priced at \$585 and is available immediately.

Systems Software Marketing Division of Sterling Software, 11050 White Rock Road, No. 100, Rancho Cordova, Calif. 95670 (916) 635-5535.

Eight devices share Ethernet transceiver

FiberCom, Inc. announced a unit that enables up to eight devices to access a fiber-optic network through a single integral Ethernet fiber-optic transceiver.

The **WhisperLAN/MPT** allows up to eight computers, personal computers or peripherals to share a single transceiver that accesses the Ethernet-based WhisperNet local-area network.

WhisperLAN/MPT costs \$1,800.

FiberCom, Inc., P.O. Box 11966, Roanoke, Va. 24022 (703) 342-6700.

Persoft enhances SmarTerm packages

Persoft, Inc. released enhanced versions of its SmarTerm terminal emulation packages and a network kit that allows IBM Personal Computers attached to either an Ungermann Bass, Inc. Net/One or a Bridge Communications, Inc. EtherTerm local-area network to access mainframes and minicomputers.

SmarTerm 220 Version 1.2, which emulates Digital Equipment Corp.'s VT220, VT100 and VT52 terminals, was enhanced to support downloading of DEC's VT200 series character set. This allows personal computer users to use characters generated by VAX host software that otherwise would not be found on a personal computer.

Both SmarTerm 220 and **SmarTerm 400 Version 3.2**, which emulates Data General Corp.'s Dasher D100, D210, D211, D400 and D410 terminals, will now allow users to define soft keys that will each store a series of often-used keystrokes.

SmarTerm 220 Version 1.2 costs \$195, and SmarTerm Version 3.2 costs \$149. Existing users can upgrade to new versions for \$50. The network kit is listing for \$50.

Persoft, Inc., 465 Science Drive, Madison, Wis. 53711 (608) 273-6000.

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COP from page 21

DBC/1012 system ranges in size from three to 1,000 processors. It uses nonprocedural DBC/SQL data base management software and provides a common user interface. The software also provides users with a DBC/1012 application interface and query system.

Packages are available supporting entry into the DBC/1012 from personal computers using the PC-DOS or MS-DOS Version 3.2 operating system and the AT&T 3B2 microcomputer using the Unix System V.2 operating system.

The license fee for up to 10 personal computers is \$5,000, while the fee for the Unix System V.2 is \$2,000. Future releases will support the Digital Equipment Corp. VMS operating system.

According to Jon Gausman, director of alternate distribution sales and marketing for Teradata, the company plans to incorporate token-ring and X.25 network capability into the COP by working with other firms that will manufacture boards engineered to support a Multibus interface.

"Teradata is not in the business of providing communications products," Gausman said. "That is not our expertise." □

Jupiter from page 21

define software modules called Softblocks and Softwires. Softblocks perform communications functions such as protocol conversion, multiplexing and X.25 packet assembling/disassembling. The Softwires define the flow of data from the Communications Interface board through a series of Softblocks to its destination.

"The system looks like a hard-wire patch panel in the communications sense, except it's all done in software," Flach said.

The Softlink operating system manages data flow control, buffering and queue management, as well as establishing connections, performing internal diagnostics, network management and reporting.

According to Flach, a System 1000 can connect to other remotely located System 1000s over X.25 networks. He said the device can also be partitioned so that one portion can be made to look like a front-end processor while another portion can be made to look like a communications server attached to a local-area network.

Jupiter offers Softblock modules supporting a number of communications protocols including asynchronous, IBM 3270 Binary Synchronous Communications, IBM Remote Job Entry, IBM Systems Network Architecture, Synchronous Data Link Control, X.25 and Transmission Control Protocol/Internet Protocol. Jupiter also supplies templates that allow programmers to develop their own Softblock modules.

Three System 1000 models, ranging in price from \$10,000 to \$130,000, are being offered. The System 1000/3 supports up to 96 lines, the System 1000/7 supports up to 384 lines, and the System 1000/14 supports up to 624 lines. □

ISOETEC from page 21

bytes of static random-access memory and 96K bytes of battery backed-up static random-access memory.

According to ISOETEC, a System 228 with digital station sets, data switching and a CRT-based operator console is priced according to trunk and station configuration. A 16-trunk, 61-station configuration costs \$36,300; a 24-trunk, 111-station configuration is \$54,600; and a 32-trunk, 151-station configuration is \$69,600.

The ISOETEC Voice Integrated Exchange voice mail system features two ports and either two or four hours of digitized voice storage. Priced at \$8,880 for a two-hour recording time and \$11,900

for the four-hour recording time, the voice mail system was made by Genesis Electronics Corp. The voice prompt-driven system gives a general greeting followed by explanations of how to leave a message. Each voice mailbox also features its own personal greeting. The sys-

tem features such functions as the ability to transfer out of voice mail to any extension or an operator, a message-waiting indicator on the message receiver's phone, forwarding personal phones to the system, direct dialing into voice mail and password protection. □

The voice prompt-driven system gives a general greeting followed by explanations of how to leave a message. Each voice mailbox also features its own personal greeting.

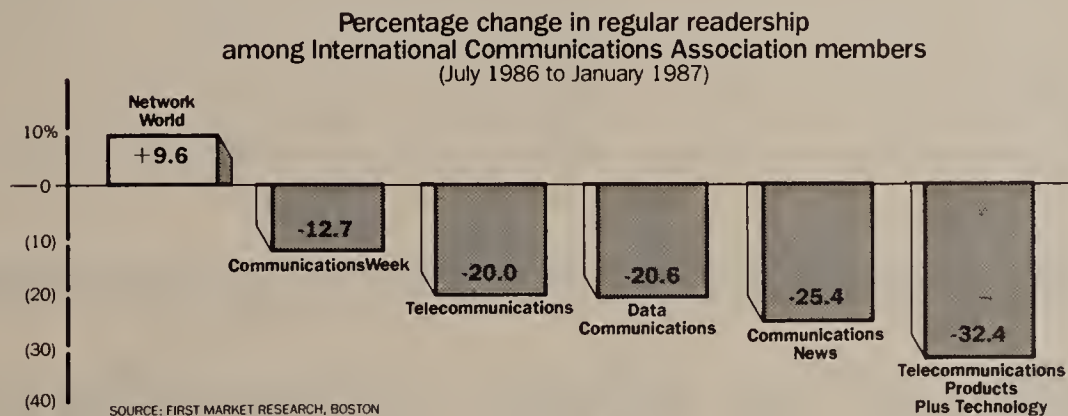
NETWORK WORLD

375 Cochituate Road, Box 9171/Framingham, MA 01701-9171/(617) 879-0700

February 23, 1987

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It took you only 10 short months to endorse the concept of networking over the passing notion of plain old communications.

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Sincerely,

Bruce Hoard
Bruce Hoard
Editor

Opinions

MARKET RESEARCH

MARK WINTHER

The perils of predicting

For centuries, scholars, scientists and seers have sought not only to predict the future, but to establish reliable methods by which to make predictions. In nearly all cases, such attempts have failed.

Nevertheless, modern business planners are compelled to make predictions, not only about market size, product growth and potential applications, but also about users' purchase motivations.

The communications industry is littered with products for which vendors and other industry experts overestimated user interest. Recent failures include AT&T's Net 1000, Federal Express Corp.'s ZapMail, the U.S. Postal Service's ECOM and International Marketnet, an IBM-Merrill Lynch & Co., Inc. joint venture to deliver financial information services. Other generic products whose value to users has been overrated include shared tenant services, teleports, videotex and its many incarnations, and digital termination service local microwave systems.

Such failures on the leading edge are not surprising. But what's inexcusable is the bad research these companies conducted before introducing their new products and services. For example, take shared tenant services. AT&T had high hopes for its Sharetech venture with United Technologies Corp. but was forced to abandon it in 1986. However, that doesn't mean no market exists for shared

Winther is director of New Communication Services at Link Resources Corp., a New York-based market research and consulting firm specializing in information and communications services.

tenant services. Tell Rockefeller Center Telecommunications Corp. (RCTC) that shared tenant services is not profitable and they'll laugh all the way to the bank. RCTC had a better plan for a service that met user needs.

As a market research and consulting firm, Link Resources Corp. is continually confronting the perils of predicting and has found that several factors influence the quality of a firm's predictions.

Methods that lead to poor predictions include: gathering information in a closed environment, overestimating consumer interest, miscalculating the direction technology will take, analyzing the product or service in isolation, obtaining faulty user research, misinterpreting economic and sociopolitical conditions, and poor extrapolation from past events to the future.

Methods that lead to accurate predictions include: knowing user adoption patterns and acceptable pricing levels, recognizing the problem of standards vs. incompatibility, accurately perceiving the macroeconomic and sociopolitical environment, and appreciating technical innovation.

A chronic error in nearly all forecast methodologies is closed system forecasting, in which the forecaster relies only on interested parties, experts and other knowledgeable people in the field. This group's bias in favor of the products and services under study may influence the forecaster, as may the magic of technology and the spectacular growth of the industry. One way to protect against such bias is to talk to users. Any analysis supported only by vendor-supplied information or secondary trade press information is weak.

Analyses based on user reactions have a better chance of being accurate. But the tendency remains for primary user research to be tainted with researchers' own preconceived notions.

New communications products and services enter the market either as enhancements to established products, such as key systems building upon telephone handsets, or as wholly new products, such as the personal computer. Many predictions for enhancements are based on a simple linear progression model in which there is a gradual acceptance of a product, or on a technology transfer model, which associates the success of one technology with another. These models are unreliable in that they fail to take into account external economic factors such as recessions and industry slowdowns.

A common related error is the improper use of analogy. Analogies are, at best, metaphors that serve as illustrative examples. An analogy is misused when it is put into a model, which then becomes the basis for projecting future development. The usefulness of the analogy is then undercut, and the resulting forecasts are either incorrect or seriously questionable.

Predicting is always a perilous task; nevertheless, it's a necessary management tool. Successful predictions are based on two key elements. The first is that the forecaster must be sufficiently open-minded not to blindly accept conventional wisdom, but to examine it critically. Finally, incorporating user perspectives and experiences is crucial to ensure that the prediction is based on user requirements. ▣

CONSULTANT ETHICS

IAN ANGUS

Who's the vendor?

When the Society of Telecommunications Consultants (STC) was founded in 1976, kickbacks and bribery played a greater role in the industry than they do today. The STC has made it clear to consultants, vendors and users that such practices are beyond the pale. Although it has not eliminated corruption, the STC has reduced it.

Today, the most important ethical issues are not as clear. Consultants face major problems in defining which business activities are incompatible with objective consulting. This debate has raged within the STC for at least three years.

The fundamental issue is: Who is eligible for STC membership? The

problem centers on computer-based services. Ten years ago, only vendors offered call detail recording, trouble report analysis, on-line network design and so on. So the STC adopted a definition of a consultant that excluded anyone providing such services. Then, in the early 1980s, two STC founders lost their memberships and a third withdrew when they began selling services and products.

Even then, a large grey area existed. Some call accounting service bureaus provided "consulting services" as sidelines or as integral parts of the business, while some leading consultants were selling traffic analysis software. Were they eligible for STC membership?

The STC adopted the view that it was acceptable to sell "tools of the trade" such as personal computer-based traffic tables, because those were the software equivalent of books or seminars. But call accounting software was different,

and anyone selling it was defined as a vendor.

As long as computers were expensive devices that few consultants could afford, the distinction held. But today it's difficult to find a consultant who isn't using a personal computer regularly. A few, including some STC members, provide facilities management services that would be impossible without the use of computerized tools that look suspiciously like call accounting systems. Others have written sophisticated software for client projects or for internal use, which they are reselling.

Are such activities compatible with providing objective consulting services?

Even the best software has limitations, and those limitations may introduce questions about objectivity. For example, a trouble report package may only work with Northern Telecom, Inc. private branch exchanges, or a call ac-

counting package may not be able to read data produced by a Hitachi America, Ltd. PBX.

If a consultant makes money from software that doesn't work with every possible brand of PBX, shouldn't there be questions about his or her objectivity when recommending PBXs to clients?

Even if the software works everywhere, with every possible product, isn't the consultant competing with vendors? Many PBX

Tell it as you see it. *Network World* is soliciting guest-penned columns for its opinions pages. Manuscripts must be letter-quality, double-spaced and approximately 600 to 750 words in length. Disk and modem submissions are preferred.

Columns should be timely, controversial, literate and technically accurate.

Contact Steve Moore, features editor, *Network World*, Box 9171, 375 Cochituate Road, Framingham, Mass. 01701, or call (617) 879-0700, ext. 584.

Angus is president of the Angus TeleManagement Group, Inc., a telecommunications research and consulting firm in Toronto. He is also editor of the monthly newsletter, "Telecom Systems Strategies."

Opinions

► TELETOONS — By Phil Frank



vendors also sell management software. Can a consultant who sells software be an objective judge of products sold by such vendors?

One proposed solution is full disclosure: The consultant must tell the client about any possible conflicts ahead of time. But such a policy would be impossible to police. More importantly, it doesn't answer the question of where to draw the consultant/vendor line. If consultants can sell computer software, what about computer hardware? And if disclosure is a solution, does that mean that consultants can sell PBXs, as long as they make a full disclosure?

Some STC members want a hard and fast rule that consultants do consulting work and nothing more. Followed logically, this approach would bar not only software sales, but seminar programs, newsletters, facility management services and many other functions that no one normally questions.

Other consultants, mostly outside the STC, deride the debate as irrelevant nitpicking. One highly respected consultant denies that any ethical issues are posed by the

fact that he also runs a firm that invests in telecommunications companies, and that he owns a major software house. This view seems to abandon all distinctions between vendors and consultants.

The majority of consultants believe that a line has to be drawn, but aren't yet sure where.

As a professional organization, the STC has serious weaknesses. Many consultants are not members, and many larger consulting firms feel that the STC offers them few benefits. Also, the STC often takes an inordinately long time to decide even the simplest matters. But the STC is the only forum in which the critical issues facing consultants and their clients are being honestly and openly debated.

These issues are again on the agenda at the STC's annual convention this May in New Orleans. Anyone interested in the future of telecommunications consulting has a stake in this debate and should attend.

Contact the Society of Telecommunications Consultants at Suite 1410, One Rockefeller Plaza, New York, N.Y. 10020 (212) 528-3909. □

TRANSMISSION TECHNOLOGY

LARRY ADLER

VSAT faults overblown

Within the past few months, the trade press has printed a number of articles either implying or pointedly stating that the satellite business is in big trouble.

Indeed, the industry has come upon hard times. Equatorial Communications Co., a firm in the vanguard of the very small aperture terminal revolution, has gone through a period of layoffs and a reduced work week. Ford Aerospace Satellite Services Corp. sold its preliminary marketing and engineering studies and its valuable Federal Communications Commission licenses after concluding that it wouldn't be profitable to market transponder space and satellite services. Other satellite firms have experienced similar problems.

But is that big news when the telecommunications and computer industries as a whole have been going through the same trials and tribulations?

In December, MCI Communications Corp. announced it would lay off 2,400 employees; AT&T announced it would eliminate 27,000 jobs, and 10,000 IBM employees opted for an early retirement package.

Why should the satellite business be immune from the same marketing and financial problems that have plagued related fields? Further, could anyone expect clear sailing for an industry suffering from the aftereffects of the Challenger disaster and the explosion of the Titan rocket?

Like the rest of the telecommunications industry, the satellite business will recover from its wounds. There may be future layoffs, losses and mergers as a result of the slowdown. But there will continue to be new satellite products and services and new entrants into the field.

Don't discount satellites just because of gloom and doom predictions or because of the hype about increased competition from fiber optics. Satellites offer unique advantages to companies that need their own private long-distance networks and can live with the half-second transmission delay and possible multiple

transmission hops. Satellites provide wide geographic coverage, reach remote locations and offer transmission costs that are unaffected by distance.

These benefits may not appeal to every corporation, but they're attractive to many users. A recent Quantum Group International study of 208 large corporations with private networks revealed that 21% of these users rely on satellites to transmit information. Since the private network market will continue to grow, the satellite business will grow as well, although at a slower pace.

One retailer, J.C. Penney Co., Inc., uses satellites as the backbone of a large network that integrates voice, data and video-conferencing. Satellite-based conferencing helps J.C. Penney's retail buyers save travel time and money, and helps the company run more efficiently. J.C. Penney's buyers now confidently make purchasing decisions in the field, based on what they see on full-color, full-motion video.

K mart Corp. announced its switch to satellites last June when it signed an agreement with GTE Corp. for a \$50 million private communications network that will ultimately connect 2,050 stores. K mart's VSAT network will be used to shorten credit authorization waiting time, provide one-way (head-quarters-to-stores) video presentations of both merchandise and corporate announcements, and offer access to sales and inventory information.

Why is satellite communications so attractive to large retail organizations? It's an inexpensive way to support low-volume, two-way, intermittent communications between widely scattered stores and a hub location.

Other users that can benefit from satellite services and networks include: government agencies that do central processing of information gathered at remote, nationwide sites; airlines, car rental agencies and hotels, who are heavily involved with credit card transactions; and insurance companies, who also need remote real-time access to centralized data bases.

The satellite business will continue to grow. It's up to users to take advantage of the applications for which satellites are uniquely qualified. □

Adler is a research consultant at Quantum Consultants, Inc., an information technology consulting firm and subsidiary of The Quantum Group International in New York.

NETWORK WORLD

Features

February 23, 1987



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Title _____ Date _____

Business Phone (_____) _____

- PLEASE ANSWER ALL QUESTIONS, SIGN AND DATE THE CARD.
- 1 My primary areas of activity. (Circle ONE only)
- I am involved in evaluating communications (data, voice and/or image) products and services:
- for use within my own company/organization
 - for resale to other companies/organizations
 - Both
 - Other (explain) _____
- 1a For communications, my primary responsibility is: (Circle ONE only)
- Data Communications
 - Voice Communications
 - Both
 - Other (explain) _____
- 2 Circle only the ONE title classification which most applies to you.
- Company Management
- Chairman, Pres., Owner, Gen. Mgr., Partner, Director, CEO, VP, Dir. Head of Finance, Admin. Procurement
- Communications Management
- Data Communications
- Management
VP, Dir., Mgr., Head, Chief: Data Communications, including Networks, Engineering, Design, R&D, Application Development
 - Supervisory/Staff:
Supervisor, Head: Networking, Design, Analysis, Engineering, R&D, Applications, Services
- Telecommunications
- Management
VP, Dir., Mgr., Head, Chief: Telecomm., Voice Comm., including Networks, Engineering, Design, R&D, Application Development
 - Supervisory/Staff: Supervisor, Head: Networks, Design, Analysis, Engineering, R&D, Applications Services
- Factory Communications
- Management
 - Supervisory/Staff
- MIS/Data Processing
- Management
VP, Dir., Mgr., Head, Chief: MIS/DP, Systems Application Development, Operations, Office Automation
 - Supervisory/Staff: Supervisor, Head of Systems Design, Analysis Applications
- Others
- Consultant
 - Educator
 - Financial Analyst
 - Marketing/Sales
 - Other _____

- 3 Job Function
- Which one of the following best describes your functional involvement with communications (data, voice, and /or video) products? (Circle ONE only)
- Corporate
- Business Management, Planning and/or Development
- Communications System/Network
- Management, Planning and/or Development
 - Implementation and/or Operation
 - Other _____
- 4 Which one of the following best describes the primary business activity of your organization at this location? (Circle ONE only)
- Consultants
- DP/Communications Consulting Services
 - Consulting Services (except DP/ Communications)
- End Users
- Manufacturer (other than computer/communications)
 - Finance/Banking/Insurance/Real Estate
 - Education
 - Medicine/Law
 - Wholesale/Retail Trade
 - Public Utility/Transportation
 - Mining/ Construction/ Petroleum Refining/ Agriculture/ Forestry
 - Business Services (excluding DP/Communications)
 - Government: Federal
 - Government: State/Local
- Vendors
- Carrier: including AT&T, BOCs, Independent Telcos, Public Data Networks, International Records Carriers
 - Interconnect
 - Manufacturer Computer/Communications Equipment
 - Value Added Reseller (VAR), Systems House, Systems Integrator
 - Distributor
 - DP/Communications Services (excluding consulting)
 - Other _____

- 5 In which ways do you typically become involved in acquiring communication products (data, voice, and/or video) and services? (Circle ALL that apply)
- Recommend/Specify
 - Identify/Evaluate Potential Vendors
 - Approve the Acquisition
 - None of the Above

- 6 Check ALL that apply in columns A and B.
- A. I am personally involved in the acquisition process (specification, selection, approval) for the following products and services:
- B. These products and services are presently in use at this location:
- | A | B | Product/Services | A | B | Product/Services |
|-----|--------------------------|--|-----|--------------------------|---|
| | | <u>Computers</u> | | | <u>Transmission/Network Services Equipment</u> |
| 01. | ☐ | ☐ Micros | 18. | ☐ | ☐ Microwave |
| 02. | ☐ | ☐ Minis | 19. | ☐ | ☐ Satellite Earth Stations |
| 03. | ☐ | ☐ Mainframes | 20. | ☐ | ☐ Local Area Networks |
| 04. | ☐ | ☐ Printers | 21. | ☐ | ☐ Wide Area Networks |
| | | <u>Data Communications</u> | 22. | ☐ | ☐ Packet Switching Equipment |
| 04. | ☐ | ☐ Communications Processors | 23. | ☐ | ☐ Fiber Optic Equipment |
| 05. | ☐ | ☐ Comm./Networks Software | 36. | ☐ | ☐ T1 |
| 06. | ☐ | ☐ Digital Switching Equipment | | | <u>Communications Services</u> |
| 07. | ☐ | ☐ Facsimile | 24. | ☐ | ☐ Packet Switching Services |
| 08. | ☐ | ☐ Modems | 25. | ☐ | ☐ Cellular Mobile Radio Services |
| 09. | ☐ | ☐ Multiplexers | 26. | ☐ | ☐ Electronic Mail |
| 10. | ☐ | ☐ Protocol Converters | 27. | ☐ | ☐ Enhanced Services |
| 11. | ☐ | ☐ Network Mgmt. & Control | 28. | ☐ | ☐ Centrex |
| 12. | ☐ | ☐ Test Equipment | 29. | ☐ | ☐ Long Haul Services |
| 13. | ☐ | ☐ 3270 Controllers | 30. | ☐ | ☐ BOC Services |
| 35. | ☐ | ☐ Intelligent Terminals | 31. | ☐ | ☐ Independent Telco Services |
| | | <u>Telecommunications</u> | | | <u>Other</u> |
| 14. | ☐ | ☐ PBXs | 32. | ☐ | ☐ Factory Communications |
| 15. | ☐ | ☐ Key Systems | 33. | ☐ | ☐ Online Data Bases |
| 16. | ☐ | ☐ Central Office Equipment | | | |
| 17. | ☐ | ☐ Integrated Voice/Data Terminals | | | |

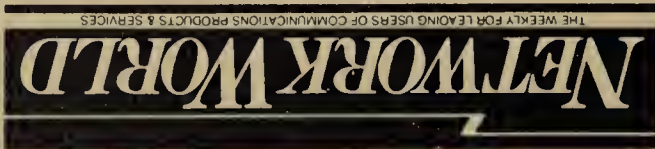
- 7 Estimated value of communications systems, equipment and services:
- A. which you helped specify, recommend or approve in last 12 months? (Check only ONE in column A.)
- B. which you plan to specify, recommend or approve in next 12 months? (Check only ONE in column B.)
- | A | B | A | B | | |
|----|--------------------------|--|----|--------------------------|--|
| 1. | ☐ | ☐ \$10 million and over | 6. | ☐ | ☐ \$100,000 - \$249,999 |
| 2. | ☐ | ☐ \$5 million - \$9.9 million | 7. | ☐ | ☐ \$50,000 - \$99,999 |
| 3. | ☐ | ☐ \$1 million - \$4.9 million | 8. | ☐ | ☐ Under \$50,000 |
| 4. | ☐ | ☐ \$500,000 - \$999,999 | 9. | ☐ | ☐ Don't Know |
| 5. | ☐ | ☐ \$250,000 - \$499,999 | | | |

- 8 Estimated gross annual revenues for your entire company/institution: (Circle ONE only)
- | | |
|-------------------------------------|-----------------------------------|
| 1. Over \$1 billion | 4. \$50 million to \$99.9 million |
| 2. \$500 million to \$1 billion | 5. \$10 million to \$49.9 million |
| 3. \$100 million to \$499.9 million | 6. \$5 million to \$9.9 million |
| | 7. under \$5 million |

- 9 Estimated number of total employees at this location: (Circle ONE only)
- | | | | |
|------------------|--------------|--------------|------------|
| 1. Over 5,000 | 3. 500 - 999 | 5. 100 - 249 | 7. 20 - 49 |
| 2. 1,000 - 4,999 | 4. 250 - 499 | 6. 50 - 99 | 8. 1 - 19 |



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Special Section: Departmental networking

The DV-1 comes of age

After two years of delays and upgrades, the DV-1 finally delivers.

Continued from page 1

rently beta testing Release 2.06 of the DV-1's base system software. Says Pearson, "Release 2.06 is much cleaner than a normal beta. But in the first 10 months the product was out, [Northern Telecom] had a lot of problems with third-party software."

The DV-1 was introduced in 1985 as an integrated voice/data system for small businesses and departmental users. It combines circuit switching for voice and packet switching for data over two 20M bit/sec buses and incorporates a variety of modules for application processing and voice/data integration. The system currently supports up to 32 terminals (or IBM Personal Computers emulating Northern Telecom terminals) and 64 telephone stations. Release 2.06 of the base system software will accommodate up to 48 terminals and 99 handsets.

Available third-party applications, based on the Unix operating system, include Q-Office from Quadratron Systems, Inc. and the Informix Database Management System from Relational Database Systems, Inc.

A total of 13 DV-1s are installed at Anchor. Three are located at the

corporate headquarters and 10 are in manufacturing plants across the U.S. The three corporate DV-1s support all departmental processing and voice and data communications capabilities for 120 users (40 terminals per system) in more than nine different departments.

Applications being run include all of the Q-Office modules (mes-

DV-1's share feature lets two terminal users view and manipulate data simultaneously.

saging, mail, word processing, electronic calculator, spreadsheet and graphics) and Informix with the File-It file processing front end. Data communications support includes 3274 and remote job entry (RJE) emulation, along with Northern Telecom's proprietary Omnilink connection to its 585 distributed data processors. Telephony features available with Northern

Telecom's M4020 terminals and directory services are also used.

Pearson found that the DV-1's telephony features are more extensive than those provided with Anchor's Rolm CBX because the DV-1s are "keyboard-driven, rather than keypad-driven." Executives also use the DV-1's Share feature, which allows two terminal users with an established phone connection on the same DV-1 to view and manipulate the same on-screen data simultaneously.

Anchor was an early DV-1 customer. In 1985, Pearson found that his existing Northern Telecom 585s were becoming obsolete, and their leases were running out. He went shopping for processors that could support both his applications and communications needs.

Although he looked at equipment from Digital Equipment Corp., Data General Corp. and IBM, as well as Northern Telecom, Pearson decided that DEC and DG didn't tie together the office functions and communications well enough at the time. IBM's System/36 also didn't support the applications or the number of users required.

"The DV-1's hardware engineering was extremely well thought out. Even though it wasn't a mature system, we felt it had poten-

See DV-1 page 30

DV-1 from page 29

tial. Being able to mix and match modules, and add enhancements as they come along gives it a longer life cycle, better than the average mini," Pearson says.

The DV-1's architecture incorporates separate modules for different functions into one or several cabinets, depending on the size of the system. The modules, connected to the voice and data buses, include multiple 68010 processors—one running Northern Telecom's proprietary operating system to control the buses and run systems programs, and one or more for running a Unix-based operating system and applications.

Other modules include storage modules, a power module, line in-

terface modules linking digital terminals and analog telephones and a network services module that integrates voice and data communications. Modules can be mixed and matched to each customer's specifications.

In his two years of working with

Northern Telecom's DV-1, Pearson found the vendor slow but conscientious about releasing software upgrades and enhancements. "At times, they were infuriatingly slow. But they will be late with upgrades rather than give you bad software," he adds.

In his two years of working with Northern Telecom's DV-1, Pearson found the vendor slow but conscientious about releasing software upgrades.

The functions being added in Release 2.06 include VT100 emulation and the ability to interconnect remote DV-1s. In the future, Pearson is looking forward to Northern Telecom's planned support of Sun Microsystems, Inc.'s Network File System protocols. He would also like to see improvements in the system's response time under loaded conditions. His one criticism: "Q-One word processing is very slow in a loaded system. With more than 10 terminal users on the system, a fast typist will see it bog down."

While Pearson believes Anchor's users put the system through its paces on a daily basis, not all DV-1 users are ready to do the same. "We think of it as a minicomputer," says Patrick Behan, a supervisor in the Information Resources Department in the Finance Division of the Scarborough Public Utilities Commission. The commission, a municipal utility, supplies electricity and water for Scarborough, a Toronto suburb.

Behan's users, who represent a range of departments and job titles, make the most of their three systems' Unix-based office applications and the IBM 3270-emulation capabilities. Two DV-1s are installed in the main office for the utility, and one is installed at a re-

Connect Your Team



Higgins Team Productivity Software For Your PC LAN

Higgins Makes Office Teamwork a Reality

Higgins is the first software product to use PC Local Area Networks to connect isolated PC users so that working together becomes a reality. With Higgins, team players use an Information Manager built on a relational database to share files, check and maintain schedules, send and receive mail, track projects and record expenses.

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mote service center. All three, dubbed K, L and M, support a mix of secretarial and administrative users doing word processing, financial users running spreadsheets, and engineers running spreadsheets and Fortran. All of the office applications are a part of the Q-Office package, and the systems also run Informix. Programmers work with COBOL, BASIC, C and Pascal on the systems.

On the data communications side, users access an IBM mainframe by emulating RJE terminals. They are linked to the service bureau host over leased lines at 9.6K bit/sec.

Each DV-1 supports between 14 and 19 terminals, which include a mix of M4020 integrated voice/data terminals, IBM Personal Computer ATs, M6110 data-only terminals compatible with IBM Personal Computers and M2500 handsets.

Like Pearson, Behan's organization was also an early user and beta site. In fact, the commission served as one of the first beta sites for the

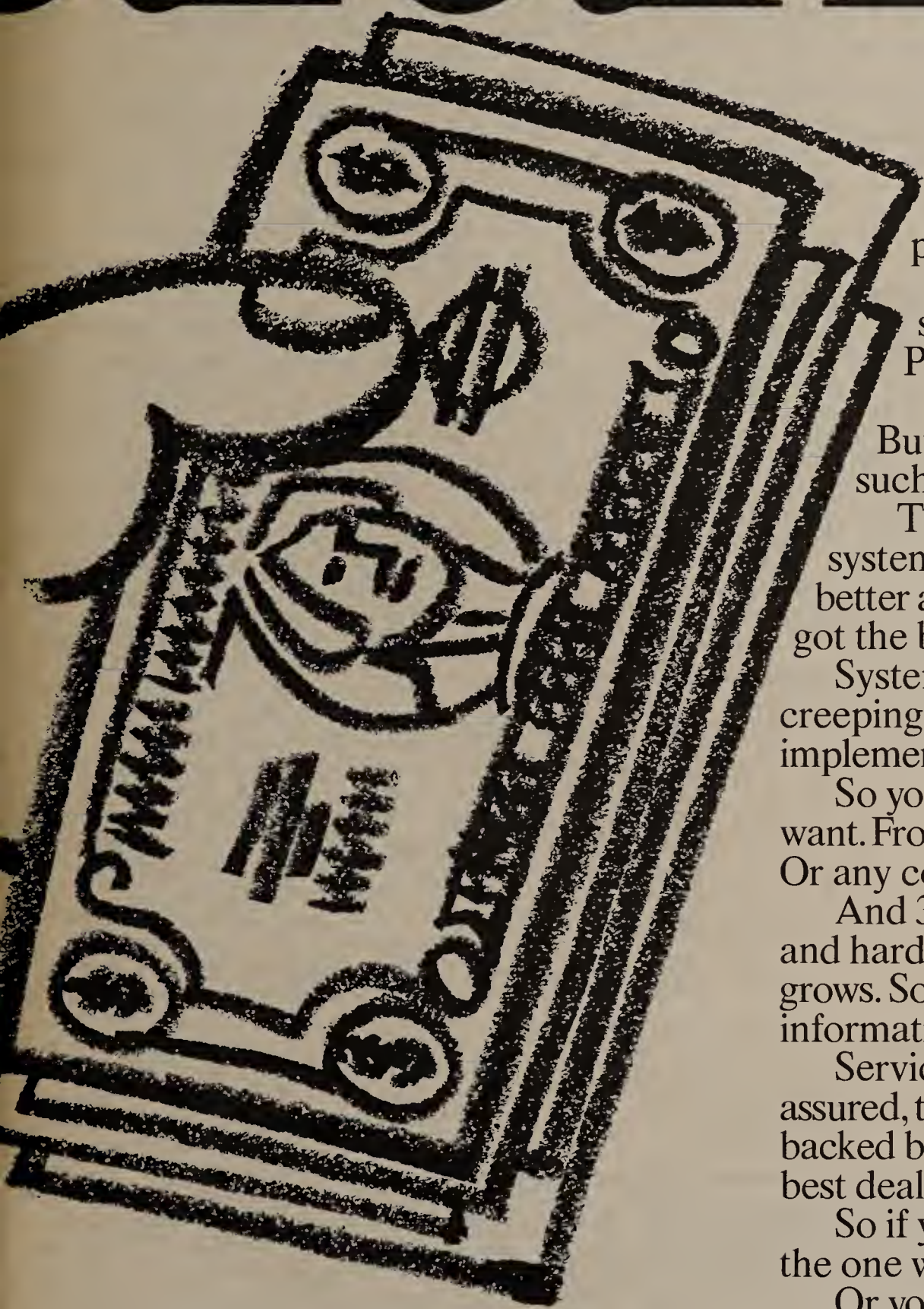
See DV-1 page 34

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DV-1 from page 30

DV-1. Behan recalls, "With the first beta, we could run a stress test and blow the machine out of the water easily. Now it seems to go down on the order of a telephone switch, rather than a minicomputer."

The commission installed the beta system after finding that user demand for information processing was outstripping the capabilities of existing 585s. Behan surveyed us-

two more DV-1s, which were installed in December. He looked at integrated office automation systems from minicomputer vendors such as DEC, considered installing an IBM 4381, looked at offerings from Rolm Corp. and Gandalf Data, Inc., and checked into personal computer networks. Local networking was easily eliminated. Says Behan, "We're not sure it works all that well. Novell, Inc. and the oth-

"With the first beta, we could run a stress test and blow the machine out of the water easily. Now it seems to go down on the order of a telephone switch, rather than a minicomputer."

ers, existing and potential, to determine what people wanted. Then he looked at a variety of vendors and equipment before deciding on the DV-1. "We had to suit the needs of sophisticated users. We also wanted to go with a vendor that could provide a complete set of applications and functions. We're too small to mix vendors."

Behan followed the same steps two years later, again looking at other vendors and different approaches, before he decided to buy

ers seem a bit fragile."

Behan decided the DV-1 could best satisfy the diverse needs of users in various departments. "The main function we thought we needed to support was RJE. The survey showed that a lot of users also wanted the office automation features and a better data base management system than dBASE II. Behan compared popular personal computer applications with those in Q-Office. He felt Q-One word processing was more sophisticated

than Wordstar and Q-Plan was comparable to Lotus Development Corp.'s 1-2-3.

"We found the 6110s made MS-DOS lovers happy as did the support of DOS in the Unix operating system." Other advantages included the fact that "we can see the service facility from here." Finally, the potential growth of the system — incremental growth — was a plus, and the price was right.

The system is not perfect, however. Behan would like to see faster and larger processors in the DV-1. He is also looking forward to the remote peer-to-peer links between DV-1s that should be available in Release 2.06 of the base system software, due out at the end of February. Finally, he would like to see some enhancements in the terminal emulation programs.

Although he feels the system is inexpensive, the training available through Bell Data Systems, Inc. — the distributor that sold him the DV-1s — is not. Behan sends the commission's own teachers to Bell Data for training. They in turn train end users using their own "warm, hand-holding" techniques.

Behan, Pearson and other DV-1 users contacted by *Network World* had two things in common: They went from using Northern Telecom's 585 distributed processors to the DV-1, and the DV-1's voice features were less important than the information processing and data communications capabilities. These were almost an afterthought. The feeling was, "Oh, by the way, it's nice that the DV-1 is a voice switch. Maybe in the future we'll take more

branch offices, departments and small business offices. The firm began by marketing the DV-1 to MIS managers who developed systems customized for their unique applications.

Now the balance is shifting toward departmental users, selling them a turnkey system directly or through distributors. These departmental users are providing them with an introduction to the MIS organization, which is largely

The system is not perfect, however. Behan would like to see faster and larger processors in the DV-1. He is also looking forward to remote peer-to-peer links.

unfamiliar with the telephony-oriented Northern Telecom, according to Roger Bushnell, director of product line management. Behan says of this telephony-MIS division, "The 585 came from the data processing world. It's one of the best kept secrets around."

Brown believes that the market for products that integrate the functions found in the DV-1 has promise, and that Northern Telecom is "headed in the right direction." He says the right moves include Northern Telecom's supporting the GEMDOS operating system, a bit-mapped display, their working with third-party application developers and implementing an 80286 processor in the system.

Wang also has an eye on that budding market and introduced a similar product last September. The enhanced Wang Integrated Office Solution uses the VS-to-WBX Control Link to integrate the functions of Wang's VS minicomputer and its WBX PBX from Telenova, Inc. They, too, began by selling into their installed base and are trying to expand beyond it.

Voice/data integration is not a new idea, however. A product similar to the DV-1 with tighter integration features, such as voice annotation of text, languished and then disappeared from the market. Its developer, Sydis, Inc., has gone under, and British Telecommunications plc now owns the rights to manufacture the product. So-called fourth-generation PBX start-ups Ztel Corp. and CXC Corp. have also dropped out of the race.

Perhaps users are just slow to accept changes in the way they work, or to integrate new technology in their work habits. Behan, who has had a DV-1 installed at the Scarborough utility for two years, is still using his old Displayphone, alongside his 4020 integrated voice/data terminal. ▀

"We also wanted to go with a vendor that could provide a complete set of applications and functions. We're too small to mix vendors."

advantage of the integrated voice/data capabilities."

The DV-1 was introduced toward the end of the 585's life cycle, providing Northern Telecom with a good pool of initial prospects for the system. Marketing the DV-1 beyond this audience is tough sledding thus far because Northern Telecom is breaking new ground with the product. "Creating new markets is always tough," says Charles Brown, a telecommunications consultant in Herndon, Va.

Says Ian Angus, president of Angus Telecommunications, Inc., "They don't know how to sell it. It's a peculiar niche. No one's ever thought about buying a departmental voice switch."

Northern Telecom is targeting



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NW

Special Section: Departmental networking

The times, they are a-changing

BY ERIC H. KILLORIN
Special to Network World

The 1960s. While Bob Dylan sang songs protesting the Vietnam War and Walter Cronkite reported on it, a less turbulent conflict raged on the technological front. Information processing became electronic, and minicomputers challenged the once undisputed dominance of mainframes.

User interest in direct paths of communication between minicomputers reached fever pitch by the end of the 1970s as the concept of distributed data processing (DDP) took hold. Processors such as Data General Corp.'s Eclipse and Digital Equipment Corp.'s PDP-11s and VAXes became the keepers of shared local files, thus challenging the centralized computing concept.

But while DDP's premise has carried well into the present day, its promise has gone largely

Killorin is the publisher of "PC Netline," a newsletter on computer networks. He is also president of Hyatt Research Corp., a data communications market research firm based in Andover, Mass.



*Fulfilling the promise
of distributed data processing.*

unfulfilled. Users continue to grapple with computer networking in its most primitive sense, and only the most progressive firms can claim any real success with DDP. The rampant incompatibility among different vendors' computing equipment is perhaps the greatest obstacle.

Today, departmental local-area net-

works have formed the technological basis for moving information among personal computers, minicomputers and mainframes. Departmental local nets also provide links to geographically distant nodes, effectively creating global networks. Although a literal interpretation of departmental networking limits it to localized communications, the concept has evolved to address today's requirement for connecting several classes of processors across many domains.

Every day, more businesses are taking on the network challenge. Companies recognize the savings offered by sharing files, software, computing power and peripherals, and they are implementing networks to smooth the flow of information within the organization. The technology of sending

0s and 1s over wire has indeed become the yarn that is weaving DDP into the very fabric of MIS.

Network implementation at the departmental level may entail general issues, such as identifying network applications, as well as more specific ones, such as choosing the appropriate

See **Changing times** page 36

Changing times from page 35

wiring specification. But there are three areas of departmental networking that network planners should have at the top of their network checklists: network management, cabling and installation, and interprocessor communications.

Delegating network management

"Who's in charge?" is perhaps the question most frequently asked of today's network managers. Locations with simple networks, like a cluster of three or four personal computers sharing a printer through a data switch, don't need a network administrator or even a network management package. However, medium-sized network installations may require a net-

work administrator to carry out housekeeping chores such as managing files, assigning volumes on the host and training users.

For larger networks, departmental network managers for each network cluster are often employed in addition to site network managers who can maintain overall control of the corporate network.

Within departmental networking, network management software is growing. Users separated by departments are increasing the size of their networks and realizing they need help to keep the information flowing. Heeding this concern is IBM with its series of NetView network management announcements.

Network planners should evaluate whether in-place twisted-pair

wiring is suitable for their present and future networking requirements. Today's wiring should be able to support tomorrow's needs. Voice-grade wire is fine for slower data speeds, but it wouldn't be prudent to expect it to support data rates above 4M or 5M bit/sec.

Coaxial expense exaggerated

The market perception that coaxial cable is more expensive than twisted pair is vastly exaggerated. Comparing the price per foot of various cable types is not an accurate indication of their cost because it doesn't reflect the cost of installation, ownership and maintenance. In many instances, coaxial cable is a better long-term investment than twisted pair because of

its greater capacity. Another advantage is that coaxial cable was designed specifically to carry data.

Labor rates for network installation should be considered prior to selecting cable. Cabling such as IBM Type 1 and 2 usually takes more time and money to install because it is bulky, less flexible and more difficult to install than other cabling types. Optical fiber is the cable of choice for many network planners because it supports higher bandwidth and longer distances.

Interprocessor communications

During the halcyon days of DDP, access to minicomputers was largely limited to dumb terminals. Now, personal computers are the preferred workstations. But in a network environment, personal computers are being turned back into dumb terminals to access other nodes.

In peer-to-peer communications, each node has the same network privileges as all the other nodes, regardless of its size. Peer-to-peer communications is essential in DDP because all nodes can talk to one another without necessarily going through a central host.

It seems that every vendor claims support for micro-to-mini-to-mainframe communications, but in reality, few provide it. In fact, DEC is probably the only minicomputer vendor with deliverable products that support peer-to-peer communications.

Network implementations from other vendors allow all types of computers to share the same backbone cable, but are unable to provide links between systems of different file structures and systems that use different protocols. That's cable sharing, not computer networking.

The message here is that "distributed processing" means just that: sharing computing power across the computing landscape. But how effectively do the five leading minicomputer vendors meet the DDP challenge?

Here's how top mini vendors address the distributed processing issue:

■ **DEC.** Maynard, Mass.-based DEC, the leader of the minicomputer revolution, is now positioning itself as the king of connectivity. DEC has developed a robust set of communications protocols known as its Digital Network Architecture (DNA). Ethernet, often thought to be synonymous with DECnet, is optional as the International Standards Organization's (ISO) Open Systems Interconnect (OSI) physical and data link layers within DNA.

DEC's strategy is simple: to provide a cost-effective way to move information from the desktop to the computer room. The heart of DEC's network strategy is its support of the VMS operating system that runs on its VAX family — the cornerstone of the firm's processor line. The advantages of a single architecture include a consistent user interface across a wide range of products, a single file structure and, most important, the ability to establish direct paths of communi-

See **Changing times** page 37



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Changing times from page 36

cation between nodes without resorting to gateways or file conversion utilities.

As it has ever since the third quarter of 1984, DEC currently holds such a strong position in the IBM interconnect market that its systems are able to communicate with IBM systems better than IBM's systems can communicate among themselves.

■ **IBM.** Big Blue hopes to extend its protocol for peer-to-peer communications, LU 6.2, to provide distributed processing for its smaller-class machines in an SNA network. This move was forced, no doubt, by the runaway success of firms such as DEC that have addressed users' demands for software compatibility within the vendor's product line. IBM is now saying that peer-to-peer is the way to go and that support for LU 6.2 will be a sure recipe for success.

But one not-so-small task remains unfinished at IBM: reconciling the rampant incompatibilities among its host operating systems. IBM's new middle-tier 9370 series computers support both Ethernet and Token-Ring connections and run the same operating system across their range. Sound familiar?

■ **Hewlett-Packard Co.** HP enjoys a strong following among the engineering community, but it is moving more slowly than DEC toward multivendor communications. Beginning with the Distributed Systems Network (DSN) family in 1977 and with AdvanceNet in 1981, HP has followed a carefully orchestrated plan to link its processors over local and wide areas.

The thrust of HP's networking strategy is to comply with the OSI model. With minicomputer vendors adhering to the seven-layer model, HP users running commercial applications can exchange files from their HP 3000 minis with IBM hosts and DEC hosts. HP 9000 systems for engineering applications, in addition to HP 1000 systems for manufacturing applications, can be linked with AdvanceNet protocols.

Recently HP introduced networking support for five application areas in addition to several complementary hardware and software products. Chief among them is support for wide-area networks with hardware and software supporting X.25 networking for a customer's private use.

■ **Prime Computer, Inc.** Unlike the other minicomputer suppliers, Prime is not positioning itself as a networking vendor. Its communications products have evolved to fill out its processor line with networking products that adequately support its customers' communications needs.

Prime's network, Prime-net, comprises hardware

and software that enables its Series 50 minicomputers to communicate over local and wide areas. Incorporated in Primeret is Ringnet, a token-passing local network supporting local-area communications. Recognizing the prominence of Ethernet, however, Prime plans to support the carrier-sense multiple access with a collision detection scheme as an alternative

data link within the Primeret product set, allowing the interconnection of Ethernet and Ringnet local nets. With this capability, Prime's customers will be able to exchange information between the two environments. Wide-area links are also provided by Prime with support for the X.25 protocol.

■ **Data General Corp.** DG, DEC's arch rival, has been

aggressive in networking in the IBM environment. The firm's local- and wide-area networking scheme, called Xodiac, supports its MV and Eclipse processors as well as its personal computers for communications over several data links.

DG sells a wide range of IBM communications links for exchanging information between the two environments. See **Changing times** page 38

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► FREQUENCY FREEDOM

FCC lifts restrictions on microwave bandwidths

Ruling offers users new network options.

BY JIM BROWN
New Products Editor

WASHINGTON, D.C. — In a move likely to spur proliferation of private microwave radio networks, the Federal Communications Commission is expected to issue a ruling today opening up the 1.8 GHz and 6.7 GHz frequency ranges to a wider array of users.

As a result of the ruling, a larger number of commercial users will be able to take advantage of private microwave voice and data communications capabilities for applications including metropolitan-area networks, intercity links between facilities and long-distance telephone bypass. But the frequencies may be limited in some areas due to existing microwave facilities.

"These frequencies are pretty heavily used around a lot of the major metropolitan areas, but they're not too heavily used out in the rural areas or between cities," said Jeffery Krauss, vice-president of corporate affairs at Rockville, Md.-based M/A-Com Development Corp. "So, there is some congestion in these two bands in some areas."

But just how severe that congestion is can only be determined through a case-by-case study. Firms specializing in frequency coordination examine geographic areas to determine availability on the basis of which frequencies are overcrowded.

The ruling will allow many commercial users to broadcast over frequencies that were previously the exclusive domain of industrial operations, public utilities and certain government agencies. The FCC breaks microwave users into two

broad categories of eligible users, commerce and industrial.

Eligible commerce users, which until the recent decision were largely limited to broadcasting in the 12.2 GHz to 12.7 GHz range, include such businesses as banks, financial and investment companies, retailers and service providers. Eligible industrial users, which were granted use of the bands affected by the ruling to meet their need for large-capacity facilities, include manufacturers, oil and gas pipeline operations, electric utilities and public safety agencies.

The order was slated to be issued today, according to its author Donald Campbell, an FCC staffer. The order will allow eligible commerce workers to use for the first time the 1.850 GHz-to-1.990 GHz and 6.525 GHz-to-6.875 GHz frequencies. Fearing overcrowding, the industrial users who enjoyed exclusivity in the two bands opposed lifting of the restriction when the FCC first voted to implement the plan last November. The recent action finalizes that decision and details the change.

In addition to broadening the definition of eligible users in the 1.8 GHz and 6.5 GHz range, Campbell said the order will contain a list of changes in technical parameters affecting some other bandwidths and changes in the use of some other bandwidths dedicated to broadcasting.

Industry watchers say the move is merely a trade-off of frequency allocations. The FCC, they say, is providing a migration path for commerce eligible users who lost broadcasting privileges in the 12.2

See **Microwave** page 42

Changing times from page 37

ments. DG's Comprehensive Electronic Office integrated office automation system and its Advanced Operating System (AOS) operating environment are supported in its family of products for IBM interconnection.

Terminal emulation packages allow DG Dasher terminals to emulate IBM 3278 devices. The firm also supports Dasher terminal emulation on selected IBM 3270 class devices, allowing IBM users to access DG hosts. DG was early to support private branch exchange-based networks and now offers links to voice switches from AT&T, Intecom, Inc., Mitel, Inc., Northern Telecom, Inc. and Rolm Corp. Document exchange capabilities for DG users permit file transfers to Wang Laboratories, Inc. and telex environments.

Despite the emergence of the personal computer and the minicomputer that substantially predates it, data base access today largely consists of terminal emula-

tion to host systems.

The notion of DDP set forth nearly 10 years ago remains an elusive goal. Vendors, with the exception of DEC, have paid it mostly lip service. IBM's goal is to provide seamless communications within its processor line. Its new directions in Advanced Peer-to-Peer Networking and SNA Low-Entry Networking will provide the beginnings of a noncentralized IBM computing environment.

Who will lead the DDP revolution? The movement of personal computers to more powerful, internal 80386-based structures will further outdistance terminal emulation as the prevalent method to access the host. Multiuser and multitasking on personal computers will help promote use of networks.

Indeed, today's personal computer will become the minicomputer of the 1990s. This, together with users' demand for access to information, regardless of its location, will be the catalyst for the long-awaited flowering of DDP. ▀

► SUBSCRIBER SUBSIDIES

Fowler plan would cut phone costs for the poor

BY MICHAEL FAHEY
Staff Writer

WASHINGTON, D.C. — Federal Communications Commission Chairman Mark Fowler recently unveiled a plan to subsidize telephone costs for the poor with a portion of the money generated by a proposed increase in monthly subscriber line charges.

The plan, dubbed Linkup America, was outlined during a meeting of FCC commissioners and members of four state regulatory commissions. An FCC spokesman said the plan would cost several hundred million dollars a year to implement.

Under Fowler's plan, a portion of a proposed hike in subscriber line charges would be used to pay up to half the cost of telephone installation, or as much as \$30, for low-income subscribers. In addition, low-income subscribers would be exempt from monthly subscriber line charges. The FCC has proposed increasing these charges from \$2 to \$3 in June 1987, and to \$4 in July 1988.

The plan to increase subscriber line charges has been criticized on the grounds that higher fees make it difficult for poor people to afford telephone service.

Fowler's plan was hailed by consumer groups but is expected to meet opposition from long-distance carriers. The funds

used to subsidize phone service for low-income people would decrease the amount of subscriber line charges used to reduce the carriers' common line access charges.

Subscriber line fees are a means of charging users directly for the cost of connecting to the telephone network. An increase in monthly subscriber line charges, in theory, would result in a decrease in the access charges for long-distance carriers, and it would lead to lower long-distance rates for users.

A recent study by the Consumer Federation of America, AT&T and the American Association of Retired Persons cites the high cost of telephone installation as a barrier to phone service for poor people. About seven million U.S. households do not have phone service, according to the study. The Linkup America plan would address the high cost of telephone installation, according to Fowler.

A spokesman for AT&T said his company did not have a formal position on Linkup America because Fowler has not officially announced the plan.

The spokesman said AT&T supports the concept of universal phone service. But, he added, AT&T's position is that the issue of universal phone service is a societal one, and long-distance carriers should not bear the cost of subsidizing phone service for poor people. ▀

IBM from page 4

models of its 3174 cluster controllers designed for use in remote locations. The 3174 Model 81R and 82R can each support four terminals.

When used with an IBM 3299 multiplexer, the controllers can support up to eight displays or as many as seven when an IBM 5209 protocol converter is employed.

The new controllers work only with non-Down Stream Load terminals, display devices that do not require the 3174 to download microcode when turned on. As such, the new controllers cannot support IBM 3290, 3179-G, 3192-G and 3193 displays.

The remote link on the Model 81R controller supports RS-232-C and CCITT V.35 interfaces as well as transmission speeds up to 9.6K bit/sec when using Binary Synchronous Communications, up to 19.2K bit/sec when using Systems Network Architecture/X.25 and up to 64K bit/sec when using SNA/SDLC. The 82R supports only the latter two. Both new controllers cost \$3,500 and will be available in the second quarter.

IBM also enhanced its entire

3174 line, enabling all models to support connections to IBM Series/1 or System/88 computers.

The company moved aggressively to thwart inroads made by fault-tolerant supplier Tandem Computers, Inc. IBM announced CICS/MVS Version 2 Release 1, which works in conjunction with IBM's Extended Recovery Facility, an extension to the MVS operating system. The new release of CICS is able to detect system failures and automatically transfer applications running under CICS to an alternate CICS system on the same or another processor. With a monthly licensing fee of \$2,485, the product will be available in the fourth quarter.

During the press briefing, IBM officials took a few thinly veiled potshots at rival Digital Equipment Corp., which has been succeeding where IBM has not due largely to its ability to tie its entire product line into comprehensive networks.

Larry J. Ford, assistant group executive of marketing and support at the Information Systems Group, said IBM cannot satisfy all its customers with a single architecture and that users require a variety of system alternatives. ▀

► INTELSAT INVESTIGATION

INTELSAT report cites \$5m in diverted funds

BY BOB HAMEL

Senior Editor

WASHINGTON, D.C. — In a confidential report delivered last week to INTELSAT's board of governors, investigators reportedly charged that former top executives Richard Colino and Jose Alegrett diverted over \$5 million in funds from the international satellite consortium.

Officials of the International Telecommunications Satellite Organization would not release the report nor comment on its findings. But according to published accounts, the document contained the results of INTELSAT's three-month internal investigation into the activities of Colino and Alegrett. Formerly, Colino was director general of INTELSAT and Alegrett was deputy director general.

The report stated, "The total amount of illegal payments thus far identified has reached the level of approximately \$5 million, of which more than two-thirds accrued directly to the benefit of Messrs. Colino and Alegrett."

At least part of the \$5 million in

diverted funds has been returned to INTELSAT, the report said.

The internal investigation is being conducted by a law firm here, reportedly in cooperation with the U.S. Attorney and the FBI. No charges have been filed against Colino or Alegrett, and the two have said they are innocent of any wrongdoing.

Last December, INTELSAT suspended Colino and Alegrett when outside auditors Peat Marwick Mitchell & Co. cited an unauthorized \$1.35 million payment made to loan brokers involved in the refinancing of the consortium's offices here.

An initial investigation said Colino had INTELSAT executives rewrite and backdate documents relating to the payment to Charles and Dana Gerrell, the Little Rock, Ark.-based mortgage brokers. In addition, investigators said Colino gave the brokers a document that eliminated the possibility of INTELSAT recovering the payment. Besides the \$1.35 million payment, the internal committee questioned a payment of \$918,000 to Simmons Mortgage Co. of Little Rock. ▮

Art from page 2

compete with local telephone companies for toll traffic within local access and transport areas.

The extent of the savings for users brought about by the competition in intra-LATA long-distance service is still unclear, but it could complicate the task of least-cost routing.

To effectively provide least-cost routing in today's environment, a PBX must be capable of considering the area code of a call's intended destination, as well as the desired exchange, according to Jerry Harder, an analyst for Nashville-based Telco Research. "For intra-LATA long distance, the PBX must be able to look at the first three digits of the area code, as well as the three digit exchange."

For users whose switches simply route by area code, Harder said that adding this so-called six-digit screening is a function of hardware and software since it requires both extra memory and processing power. "Some older switches have limited memory," Harder said. "Switches are computers, and the more functionality you have, the more memory you need."

Most large PBXs built after 1975 provide the six-digit screening, according to Bob Jordan, a marketing manager with Rolm Corp.

But even for users with newer and larger PBXs with adequate memory and processing power capable of providing six-digit screening, there are two additional problems: obtaining the latest tariff information and updating the so-called lookup tables in the PBX least-cost routing software.

The long-distance carriers can supply information about tariff changes, but a number of experts, including Ed Horrell, president of Mitchell & Horrell, a Memphis, Tenn.-based telecommunications consulting company, expressed skepticism about the carrier's willingness to do so. "About the time you tell AT&T or MCI that you are going to someone else, is when they will come in and tell you how to monkey around with your least-cost routing," Horrell said.

"The PBX vendor is not going to rush out every time there is a change in the tariff or in your configuration," Horrell said. "There is very little incentive for them. They will end up charging you \$100 and make only \$15."

Users turn to consultants

In many cases, users turn to consultants for both tariff information and for help in actually updating the PBX tables. Companies such as Economics and Technology, Inc. (ETI), a Boston-based consulting company, provide updated tariff and pricing information to users and vendors.

Page Montgomery, vice-president of ETI, said that intra-LATA long-distance competition may offer only marginal savings, but, he added, users in pursuit of such savings may require finely honed least-cost routing capabilities.

Even for users able to obtain the latest tariff information, updating the software tables is a tedious and precise task. Telco Research's Harder agreed, saying that updating least-cost routing tables is a "boring but nontrivial task." ▮

NetView from page 1

gle network console. This is the promise IBM makes with NetView.

"What NetView does is legitimize the concept of network management programs talking to foreign vendors' equipment," said Hal Clark, senior product manager for network management at Digital Communications Associates, Inc. (DCA).

But while NetView lays the groundwork for multivendor network management, the fact that it is a host-based software system may stymie its future as a comprehensive network control facility capable of network modification.

"If NetView on the host is going to control non-SNA equipment, it will require not only product-specific interfaces for NetView/PC, but some kind of application program on the IBM host where NetView resides. And that is where the smaller vendors are going to shy away from it," said Charles Will, product manager at Bytex.

If vendors will not or cannot come up with that host-based software, NetView will be almost solely a one-way reporting system, observers concurred. It will collect information from non-SNA devices equipped with the proper interface, but will not be able to control those devices.

About 10 vendors have so far announced products supporting NetView/PC, the personal computer-based gateway for non-IBM vendors seeking entrance to NetView. Many others claim to be developing interfaces for their products. But it is not clear whether these companies will devote the effort needed to develop host software to pro-

vide for full network control.

Kenneth Brantley, director of marketing administration at NCR Comten, Inc., pointed out that NetView has some limited command capability. "For example, NetView can issue a command that causes an IBM-compatible modem to go into a test mode and can then retrieve the test results."

But according to BBN Communication Corp.'s Charles Zaiontz, IBM doesn't seem to have a clear strategy for how the mainframe will use the collected data. So far, he said, NetView does not allow the user to send requests for tests such as modem diagnostics from NetView's console at the host to foreign vendors' net management systems. Such support would make NetView much more powerful, according to Bill Hendrick, product line manager for network management systems at Paradyne Corp.

"Technically, I think we're just seeing the tip of the iceberg, and [NetView] will grow in capability," DCA's Clark said.

Most vendors of net management systems who sell into SNA environments believe the marketing power behind NetView alone is enough to make NetView compatibility essential.

Users stand to gain not just from NetView itself, but from enhanced NetView capabilities sold by other vendors. Don Passaro, product manager for network management at Paradyne, said that added value will be the key to product differentiation in this market. Hendrick agreed. "I know we will enhance our own net management system over and above what NetView can give the users today," he said. ▮

LU 6.2 from page 8

support older devices — a problem many potential LU 6.2 users face.

"It took quite a bit of planning. The LU 6.2 work itself was a small part of the job," Baker said. "I have people familiar with doing that kind of programming. They're used to writing programs that have to pay attention to protocol and recoverability issues." Baker added that he would not entrust this kind of coding to "run-of-the-mill programmers."

A major part of the project was creating a data entry utility for the personal computers. This utility includes predesigned forms, performs functions such as screen painting and has editing capabilities.

Since these processes are handled at the personal computer level, "we are only sending the data content and the response" to and from the mainframe over the network, Baker said.

IBM Personal Computers on Baxter Travenol's network communicate with servers via IBM's Network Basic I/O System. The server, in turn, is linked to CICS on an IBM mainframe using CSI's Access/SNA APPC software and code developed by Baker's group. CICS then uses intersystem communications to converse with order-processing and inventory-control programs written under IBM's IMS data base

management system.

"We developed five CICS applications that act as interfaces to the LAN," Baker said. These applications handle inbound and outbound interactive traffic, inbound and outbound bulk processing, and transfer from mainframe report generators to spoolers on the local networks. In bulk processing, users can create a batch of transactions, which are shipped to IMS on the mainframe for processing.

Since LU 6.2 is capable of sending multiple streams of data simultaneously, personal computer users can have several processes executing in parallel, according to Bedford Associates' Graves. This contrasts dramatically with typical terminal-to-host operation.

Using LU 6.2 in conjunction with a personal computer is "like submitting a batch job and continuing with a foreground task," Graves said. "If you can do something faster, that's real money."

Graves acknowledges that many data processing managers don't see much value in LU 6.2 because they have to rewrite their applications to take full advantage of its functionality. However, the companies that are implementing LU 6.2 "are using it to gain a competitive advantage," Graves said. But the bottom line is that "people are going to have to sort out the value of LU 6.2 for themselves," Graves said. ▮

► MODEM MARKDOWN

Telebit slashes prices

BY MARY PETROSKY
West Coast Correspondent

CUPERTINO, Calif. — Telebit Corp. is expected to announce today it will slash the price of its high-speed modems by nearly 45%, a move applauded by one user of the company's products.

Telebit said it will cut the prices of its TrailBlazer PC 18K bit/sec dial-up modems, which were introduced in 1985. The price of the internal version of the modem, a card for IBM Personal Computers and compatibles, has been cut 40%, from \$1,995 to \$1,195. The stand-alone and rack-mounted versions of the TrailBlazer PC will drop 44%, from \$2,395 to \$1,345.

The price cuts are aimed at increasing Telebit's share of the modem market and go hand in hand with the company's expanded distribution strategy, according to James Jordan, president and chief executive officer.

Telebit's direct sales force will now be calling on large users as well as selling to computer and equipment vendors and distributors, Jordan said. Jordan, who helped found Ungermann-Bass, Inc., joined Telebit four months ago.

Jordan said the Trailblazer had won good ratings, but its high cost meant that "in the past, users had to cost-justify it for a specific application," he said. Now, Jordan said he believes users planning to buy 1,200 bit/sec and faster modems will consider the TrailBlazer.

Telebit's new prices could save Rockwell International Corp.'s Space Transportation Systems Division up to several hundred thousand dollars this year alone, according to Chuck Stone, project manager for Information Systems

Management. The Division currently has 25 Telebit modems in place to provide personal computers access to a data base that stores bit-mapped graphics data.

Depending upon the number of contracts the Rockwell Division receives this year, Stone expects to buy 25 to 200 more Telebit modems. "With the price reductions you're talking about, we'll be able to lower our costs, and that's good news," Stone said.

Jack Musgrove, associate director of telecommunications industry service for Dataquest, Inc., noted that dial-up communications is becoming more attractive as long-haul rates drop. Costs for leased lines, by comparison, have remained stable or increased. Telebit's price cuts "are going to cause people to really look at their applications and to evaluate leased versus dial-up lines," he said.

"There have already been some aggressive pricing moves in the high-bandwidth end of the modem market," Musgrove said in reference to U.S. Robotics, Inc., which introduced a 9.6K bit/sec modem last fall that lists for \$995. These modems are typically priced around \$3,000.

"We're talking about a brand new price point for dial-up modems," said Musgrove of Telebit's price cuts. Telebit's pricing makes its modems less expensive than most 9.6K bit/sec dial-up products on the market and comparably priced to similar speed modems for use with leased lines, Musgrove said.

Musgrove said Telebit isn't risking much in slashing its prices. "I think some of this technology is overpriced. Telebit can still make money at this price. It's not going to take a bath," he said. ▮

Upgrade from page 1

process that began when Indiana's state universities embarked on an upgrade of an existing one-way videoconferencing system that was running out of bandwidth.

The 20-year-old network, called Indiana Higher Education Telecommunications System (IHETS), is a dedicated private microwave net built by AT&T. The universities were billed under a special AT&T tariff, and the net was maintained by Indiana Bell. The universities estimated that upgrading IHETS would have cost \$30 million.

Rather than simply replace the videoconferencing network, state officials began examining the possibility of integrating IHETS transmission facilities with existing university and state government voice and data network facilities. The state and schools had been using a combination of Centrex services, private-line offerings, foreign exchange lines and WATS services for these networks. Many of the line charges were set under Telpak, a now defunct AT&T bulk discount option. The state's telecommunications costs rose dramatically when AT&T discontinued Telpak.

Two years ago, the governor formed a special eight-member task force to examine the feasibility of integrating the networks. By consolidating lines, the state hoped to realize substantial cost savings as well as supply users with additional network capabilities.

The state did not want to install a private T-1 network for a number of reasons, according to Jeffrey Held, group manager at Network Strategies, Inc. (NSI), a consulting firm in Fairfax, Va. The state did not want to make a large capital investment, and T-1 facilities were not available in all locations. Held's group at NSI helped Indiana officials draft the Indiana Telecommunications Network request for proposal.

The RFP required the vendor to

supply, among other things, a central network management system, a fixed rate for all line costs for the life of the contract and the capability to expand the network dramatically at predetermined costs. Three teams bid for the contract: AT&T, Electronic Data Systems Corp. with Indiana Bell, and the GTE team.

GTE won the contract, according to Thomas Ho, executive director of the INTELENET Commission, because the company could supply an all-digital network and would install 150 miles of fiber cable in the eastern part of the state. Additionally, GTE's prices were more than 10% below competitors' rates. Held estimated that INTELNET's proposed line costs were 46% lower than comparable private-line offerings.

Under the terms of the contract, GTE will purchase, install and maintain all of the network equipment, including fiber-optic multiplexers from NEC Corp., T-1 multiplexers and digital access crossconnect systems from Tellabs, Inc., video coder/decoders from ABL Engineering, Inc., tandem switches from Digital Switch Corp. and a network management system based on a Digital Equipment Corp. VAX superminicomputer.

The first phase of installation for the network will take place during the next six months, when six of 16 sites will be cut over to INTELENET. By the summer of 1988, all 16 sites should be on the network. The contract runs for five years; and the state has the option to renew the pact at fixed costs for five more years. The state also has options to increase the scope of the network.

"By consolidating our networks, we will be able to significantly cut our costs," Ho said. "We will also have much more flexibility as our data applications grow because we will be able to add switched and dedicated circuits at speeds from 1,200 to 64K bit/sec." ▮

► FCC

Dennis backs free BOCs

Endorses entry to information services.

BY KARYL SCOTT
Washington, D.C. Correspondent

WASHINGTON, D.C. — In a speech before the Federal Communications Bar Association here, FCC Commissioner Patricia Diaz Dennis last week gave a ringing endorsement of Bell operating company entry into the information services business.

Dennis also gave her support to BOC participation in equipment manufacturing, but remained neutral on proposals to allow the BOCs to offer long-distance service.

"Telecommunications customers may have to wait too long and may be deprived of many of the benefits of telecommunications and computer integration if the BOCs are excluded from offering infor-

mation services," Dennis said in her first public address since her appointment to the FCC last June.

Arguing that the U.S. needs to improve its international competitiveness, Dennis said, "Universal access to information services is key to our information- and service-based economy. What's at stake here is the U.S.'s ability to compete in the information age."

Many foreign competitors are ahead of the U.S. in the provision of affordable information services, Dennis said. "Our international competitors are designing and offering integrated communications and computer services currently off limits to the BOCs."

These nations offer information services both through private and government-run ventures, under-

scoring "the global conviction that national economic and social development depends upon ubiquitous access to advanced telecommunications and information services," Dennis said.

While some observers argue that BOC entry into the information services sector will harm players already in the market, such as value-added network providers, Dennis said BOC entry will have the "snowball effect" of stimulating entry of additional information service providers and equipment vendors.

Dennis' call for BOC freedom in the information services market was tempered by her reminder of the need for regulation of BOC behavior. "The BOCs still control the electronic paths to virtually every home and business in America, and as long as such a monopoly exists, terms and conditions must be carefully crafted and monitored to prevent BOC discrimination and cost shifting," she said.

Shifting her talk to prohibitions on BOC equipment manufacturing,

Dennis said the line between prohibited manufacturing and permissible marketing of telecommunications equipment is blurring. "It is becoming increasingly difficult to allow the BOCs to sell customer premises equipment without engaging in manufacturing," Dennis said.

The BOCs' share of the customer premises equipment market in 1985 was about 10%, and their share of manufacturing would likely be of the same magnitude, she said.

Dennis' attitude toward BOC entry into the interexchange market was less clear. While acknowledging that BOC presence in the long-distance business "would further bolster competition," and that the BOCs have the "necessary expertise and financial stability to be long-term players," she reserved judgment on the Department of Justice's recent recommendation to allow the BOCs into the market.

Dennis declined to explain how BOC entry into the long-distance business would benefit users. ▮

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Buyout from page 1
targeted for acquisition.

Once the acquisitions have been completed, NMI intends to offer integrated network management products as well as services to help users weave together network management tools from NMI and other vendors.

Five venture capital suppliers, Alan Patricof Associates, Inc., ABS Ventures, Inc., Bessemer Venture Partners, Oak Investment Partners

of net management tools.

The end result: NMI will offer both network management products and systems integration services that enable customers to build complete network management systems.

At first, Frank said, NMI will act merely as a holding company with a small staff. Initially, NMI employees will include Frank and Michael Muntner, former president of Contel's Government System Divi-

the individual companies for the next 12 to 18 months. Eventually, one company's product will be chosen as the focal point for other NMI network management components, and new products will be tied to this central offering.

The company will compete with traditional niche network management suppliers as well as companies like IBM and Wang Laboratories, Inc., which are also trying to develop comprehensive network management offerings.

NMI is also expected to act as a systems integrator, helping users meld network management products into a single system. Systems integration services will include development of custom software packages. In this area, the company will run up against traditional systems integrators such as Electronic Data Systems Corp., and emerging network management integrators like the regional Bell holding companies.

NMI is the second company founded by Frank. In 1970, he formed Network Analysis Corp., a consulting firm that was acquired by Contel Information Services in 1980. Frank remained at Contel until 1985, when he began working as an independent consultant. □

Frank said recent growth in user networks and the breakup of AT&T have combined to create a need NMI hopes to address.

and Orange Nassau, have reportedly pumped as much as \$50 million into NMI to fuel the company's upcoming acquisition binge.

Frank said recent growth in user networks and the breakup of AT&T have combined to create a need NMI hopes to address. Users are being forced to integrate disparate network management products into a coherent whole, Frank said, and NMI plans to relieve commercial and government users of that burden.

NMI intends to purchase companies with products in six areas: inventory control, station message detail recording reports, network design, facilities management, network planning and real-time data diagnostics.

In addition, the company expects to purchase a systems integration company and form strategic alliances and possibly OEM agreements with current vendors

sion. The company will later add a chief financial officer and a vice-president of marketing. "We will stay small because the bulk of our staff will come from the companies we acquire," Frank said. During 1988, the company will attempt to forge a management team with the executives of the acquired firms.

NMI will sell equipment from

Microwave from page 38
GHz-to-12.7 GHz range when the FCC voted in 1983 to hand those frequencies over to direct broadcast satellite service, a service designed to broadcast directly to home televisions.

However, the move may wind up benefiting commerce eligible users by increasing the length of transmission distance over what they were accustomed to in the 12.2 GHz to 12.7 GHz range and providing them with greater voice and

data carrying capacities.

Business users were limited to use of 800 KHz-wide channels in the 12.2 GHz-to-12.7 GHz range. Current channel allotments in the frequencies to which the FCC is migrating business users range between 10 MHz and 20 MHz in bandwidth. Microwave facilities using the 1.8 GHz and 6.5 GHz frequencies can travel distances of 40 miles between antennas and carry the equivalent of over 600 56K bit/sec channels. □

CALENDAR

Feb. 26-27, Denver — Understanding and Selecting Voice Messaging Systems and Maximizing the Potential of Your Voice Messaging System. Also, March 9-10, San Francisco; March 24-25, Washington, D.C.; April 27-28, Boston. Contact: *Business Communications Review*, 950 York Road, Hinsdale, Ill. 60521.

March 2-4, Los Angeles — Modern Data Transmission. Contact: UCLA Extension, P.O. Box 24091, Los Angeles, Calif. 90024.

March 3-4, Washington, D.C. — Networking the IBM PC, XT, AT and Compatibles. Also, March 10-11, Dallas; March 17-18, Chicago; March 24-25, Cincinnati. Contact: Data-Tech Institute, Lakeview Plaza, P.O. Box 2429, Clifton, N.J. 07015.

March 3-5, Washington, D.C. — Telecommunications for Distributed Processing Systems. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

March 4, Boston — Alternatives for Voice Messaging. Contact: Women in Telecommunication, P.O. Box 1344, Cambridge, Mass. 02238.

March 4-6, Columbus, Ohio — Data Communications: A User's Guide for Today's Changing Network Environment. Also, March 11-13, Boston; March 18-20, Milwaukee; March 25-27, Los Angeles. Contact: Center for Advanced Professional Education, Suite 110, 1820 E. Garry St., Santa Ana, Calif. 92705.

March 9-10, Montreal — Open Systems Interconnection. Also, March 12-13, Boston; March 23-24, Washington, D.C.; March 26-27, Toronto. Contact: Technology Training Corp., Dept. OSI/SNA, P.O. Box 3608, Torrance, Calif. 90510.

March 9-11, Washington, D.C. — VSAT Design, Analysis, and Applications for Data, Voice, and Video Environments. Contact: Continuing Engineering Education Program, George Washington University, Washington, D.C. 20052.

March 10-11, Washington, D.C. — Open Network Architecture. Contact: Phillips Publishing, Inc., 7811 Montrose Road, Potomac, Md. 20854.

March 11-12, New York — Understanding ISDN. Also, March 23-24, Chicago. Contact: Telecommunications Research Associates, P.O. Box 1200, Newark, Ill. 60541.

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► PRODUCT REVIEW

PCs resolve image problems

Personal computer expansion boards provide instant facsimile capability.

BY JOHN J. HUNTER
Contributing Writer

A battle is about to break out in the facsimile market, and its outcome will greatly affect industry highfliers such as Ricoh Co., Ltd., Pitney Bowes, Inc. and NEC Corp. The combatants will be personal computers equipped with special hardware and software that turn them into CCITT Group III facsimile transceivers, vs. the current breed of somewhat larger and more expensive facsimile transceivers.

An inkling that this confrontation was coming occurred several months ago, when rumors began circulating about hardware and software that would allow a personal computer to take on the functions of a facsimile machine. Since then, two such units have been introduced.

As rumored, these machines employ a high-resolution document scanner for handling page transmissions and use the personal computer's storage facilities and attached dot matrix or laser printer to accommodate received pages. In short, the personal computer provides services available on expensive facsimile units, but at substantially lower prices.

Further, the units work with any CCITT Group III-compatible machine. And as a bonus, the personal computer can continue to be used for normal operations when not serving as a facsimile, and one of the products lets the computer perform other functions while facsimile documents are being received.

Facsimile plug-in cards

The two products are Datacopy Corp.'s MicroFax and Cable & Wireless North America, Inc.'s DataFax. Both consist of a plug-in card that fits into a full-size expansion slot on the personal computer's mother board and control software that's supplied on a floppy disk. The minimum system requirement is MS-DOS 3.0, 512K bytes of memory and a hard disk, although a floppy can be used to hold transmitted pages.

The MicroFax and DataFax differ in the way their services are offered and performed. Their expansion cards provide the hardware needed to transmit and receive printed documents, and they contain low- and high-speed modems on one card. The DataFax has a 1,200 bit/sec Bell 103/212A- and Hayes Microcomputer Products, Inc.-compatible modem, plus a 9.6K bit/sec modem. The MicroFax includes a Hayes-compatible 1,200 to 2,400 bit/sec modem and a 9.6K bit/sec modem.

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The low-speed modems handle normal ASCII data communications for file transfers, while the high-speed units are used for facsimile transmission. In addition to their primary 9.6K bit/sec speed, both high-speed modems can also fall back to 7.2K bit/sec, 4.2K bit/sec and 2,400 bit/sec. This is important because most Group III facsimile transceivers employ 9.6K bit/sec modems with those fallback rates.

The user configures the MicroFax and DataFax from a menu using fairly simple instructions. Both products allow the personal computer to receive documents from facsimile machines conforming to CCITT Group III transmission specifications, and they can also

nals the sending unit to prepare to receive documents and turns control over to the other personal computer or the host processor. With turnaround polling, reverse transmission can be done while telephone connections are established, obviating the need to initiate the normal "handshaking" associated when communications links are established.

Documents received can be retrieved from disk for viewing on the personal computer's screen or can be transferred from memory to a dot matrix or laser printer. According to both vendors, any printer compatible with the IBM Personal Computer can be used to print facsimile images. The laser printer, however, is necessary for repro-

cally. The units also generate an activity log showing when and to whom pages were transmitted.

The basic, receive-only MicroFax and DataFax units are priced at \$1,195 and \$995, respectively, and the document scanners cost \$1,300 and \$1,295, respectively. The price of a personal computer must also be factored in if the user does not have one. However, companies that small probably do not need facsimile capability.

Who should buy

Are products like MicroFax and DataFax worth the money? That depends upon the application. For example, fairly basic stand-alone facsimile transceivers with a modem, an autodialer and Group III compatibility are available for under \$2,000. Those units, however, are only intended for applications where pages are sent from one location to another. Using them to broadcast pages to multiple sites usually requires a great deal of operator intervention for such tasks as loading pages and pressing the autodialer button.

Other facsimile transceivers are available that provide sophisticated services similar to those offered by MicroFax and DataFax. The highly regarded Pitney-Bowes 8900, Ricoh R-610 and NEC Bit IV all have page storage, a 200 by 200 line per inch and 200 by 100 line per inch scan capability, built-in modems and autodialers, half-tone transmission facilities and turnaround polling.

Their prices, however, are at least double the cost of the MicroFax and DataFax. The Pitney-Bowes and Ricoh units list for around \$5,000, and the NEC unit carries a \$12,000 price tag. On the other hand, those three products also support CCITT Group I and II analog transmissions and can therefore communicate with legions of facsimile machines. The MicroFax and DataFax units are Group III-compatible only.

Effect on market

What will products like MicroFax and DataFax do to the stand-alone facsimile transceiver market? They will certainly impact the high-end products, and when their prices come down, personal computer facsimile units will appeal to the large segment of the marketplace that needs only basic services now, but plans to expand facsimile operations in the future.

In the near term, look for facsimile manufacturers to engage in price cutting. In the long-term, they'll probably offer products similar to MicroFax and DataFax. Indeed, the first volley in the facsimile battle is about to be fired: Pitney-Bowes is readying its own personal computer-based facsimile system. □

Two personal computer facsimile cards compared

	Vendor/Product	
	Cable & Wireless North America, Inc./DataFax	Datacopy Corp./MicroFax
Internal storage	✓	✓
Unattended operation	✓	✓
Turnaround polling		✓
Price	\$995 to \$2,290	\$1,195 to \$2,495

SOURCE: TMS CORP., DEVON, PA.

interact with other personal computers equipped with the same facsimile facilities.

The basic MicroFax and DataFax units support document reception only. However, both units can be equipped with an optional scanner for document transmission. Receiving a document is like receiving a file transfer from another personal computer or a host computer. The receiving unit operator creates a file name under which the received documents are stored, and the MicroFax and DataFax software spools the received documents to disk or diskette.

The software also permits both units to accept pages unattended by handling the log-on and the log-off procedures associated with the communications and data transfer functions.

The MicroFax edge

The MicroFax has more advanced facilities for handling received documents. For example, the unit's procedures for document reception operate in background mode, allowing the personal computer to be used for other processing tasks while pages are received. By contrast, the DataFax monopolizes the personal computer.

Another useful Microfax feature is its ability to handle turnaround polling. That facility, available on many higher priced facsimile units, allows a facsimile unit sending a document to check whether the receiving unit has any documents to transmit back. If so, it sig-

ducing acceptable half-tone, or photographic, images.

Resolution excellent

To transmit documents, MicroFax and DataFax require the use of an external document scanner. In the MicroFax, scanner output is linked to the same card used to receive documents; the DataFax unit requires a separate card to handle data transmissions. The scanners themselves are hand-fed single-sheet units, but the scanning resolution is an excellent 200 by 200 line per inch or 200 by 100 line per inch. The lower scan rate is employed for fine or light printing, while the higher rate produces more normal print quality.

The DataFax uses a Canon, Inc. IX-8/IX-12 compact image scanner that was designed for personal computers. MicroFax declined to say who manufactures the unit it sells. The maximum sheet size for the Canon unit is 8.5 by 11 inches; the MicroFax scanner accepts an 8.5- by 14-inch page.

Both units are suitable for deferred document transfers and have the capability for batch and multiaddress transmissions. Pages to be transmitted can be associated with a particular user or group of users, and abbreviated dial telephone numbers can be assigned. Users can sequentially broadcast to all locations or can address individual locations, and they can indicate the date and time that pages should be sent. The transmission process is then handled automati-

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